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Åke Niemi: Influence of the Soviet tenancy on the flora of the Porkala area

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SOCIETAS PRO FAUNA ET FLORA FENNICA

INFLUENCE OF THE SOVIET TENANCY ON THE FLORA OF THE PORKALA AREA

BY

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Abstract

Adventive plants were introduced by traffic from the east during the Soviet tenancy which lasted 11 years. The eastern element could chiefly be noted around loading places at railway stations, and by harbours and Soviet buildings. The flora of the military islands and other localities where the vegetation is disturbed or destroyed is also described. During the period 1957—1963 an obvious decrease in the eastern adventive species could be observed. The element introduced by Soviet traffic is grouped according to geographical distribution and history of introduction. A list is given of the species showing some connection with the activity during the tenancy.

I. Introduction

The present article is a summary of my Ph.lic thesis (NIEMI 1964, 1966), the aim of which was to examine to what degree Soviet military activity in Porkala between 1944 and 1955 enriched the flora with eastern plants. The investigations of the polemochorous flora (MANNERKORPI 1944:39) were carried out chiefly in the years 1957—60. The localities examined in these years were also visited in 1962—63 when a new inventory was made in connection with other studies on the hemerophilous flora of the area.

In 1955 Societas pro Fauna et Flora Fennica made a program of investigation in order to elucidate the biological changes caused by the tenancy (Memoranda Soc. Fauna Flora Fennica 32:2, 104). A team led by Dr. G. Bergman studied changes in the mammalian and bird fauna (BERGMAN 1957).

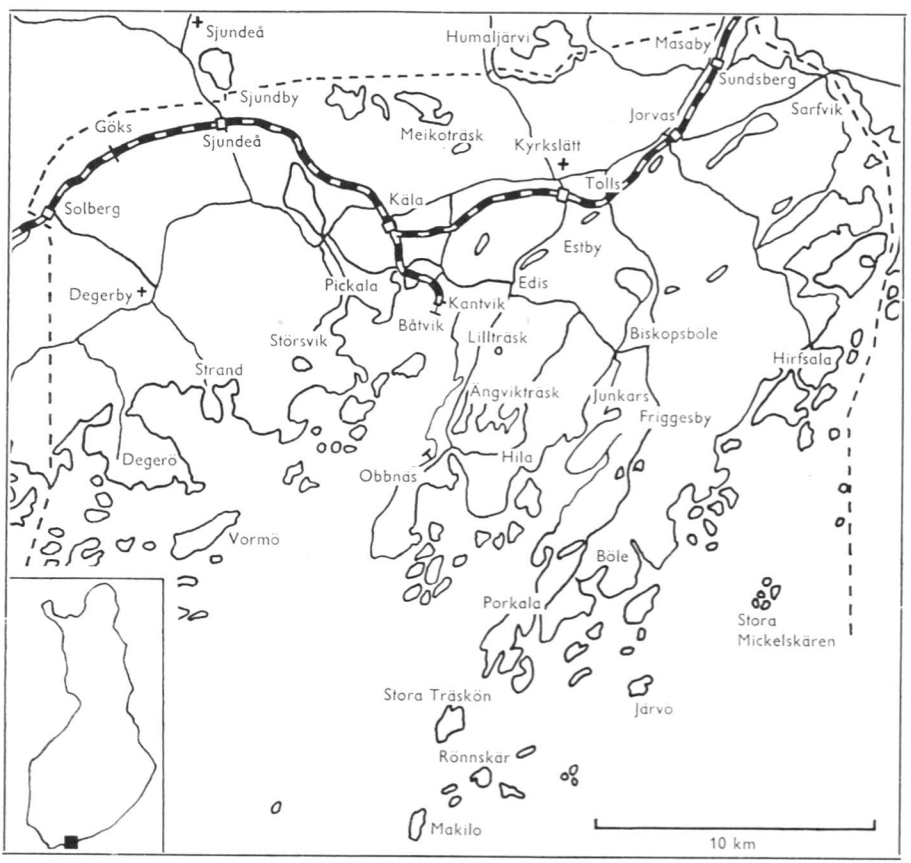

FIG. 1. Map of the area studied.

II. The study area

In accordance with the Moscow Settlement of 19. 9. 1944, Finland rented the Porkala area to the Soviet Union for 50 years. The area (Fig. 1) extended from Esboviken in the east to the meridian 24°7′ in the west, from the Gulf of Finland in the south to the shores of Humaljärvi and to Tjusträsk in the north. The area comprised 2/3 of the commune of Kyrkslätt, almost the whole of Degerby, the southern part of Sjundeå, a part of Ingå and small parts of Esbo, in all, 380.72 km² (T. BRENNER 1945:9—11). In 1956 Degerby was incorporated in Ingå commune (but in this study Degerby is dealt with as a separate commune). The name Porkala is used here to indicate the whole tenancy area. In January 1956 the area was returned after a tenancy of 11 years.

1. Geography

The area is characterized by a deeply indented coastline with the Porkala and Obbnäs peninsulas projecting far into the sea, and two long firths: Esboviken and Tavastfjärden. The archipelago zones (»skärgårdszon») distinguished by HÄYRÉN (1900, 1931, cf. also W. BRENNER 1921b and LUTHER 1961b) are readily recognized in certain areas, for instance in Esboviken in the east and outside Degerby in the west. At the Porkala and Obbnäs peninsulas the mainland stretches out almost as far as the sea zone.

The bedrock, granite and gneiss, is mostly covered by moraine deposits. In Kyrkslätt especially, the valleys extend in a SW-NE direction. The valley »Draget», which extends from Hemviken in the west via Djupström, Tollsträsk and Gillobackaträsk to Esboviken in the east, was earlier a strait (cf. CEDERCREUTZ 1927 map 64). Another similar valley extends from Saltfjärden via Träskby träsk to Långvik. In the south part of Sjundeå and in Degerby are plains with extensive agricultural areas. Sand soils are few, but are found in such places as Obbnäs (Kyrkslätt), Störsvik (Sjundeå) and Malm (Degerby).

There are climatic differences between the archipelago and the mainland in the north (e.g. CEDERCREUTZ 1927:13). JALAS (1957:7) includes the Porkala area in the oak zone. The vegetation mostly consists of woodland interspersed with cultivated areas. On poorer soils and in the archipelago, pinewoods predominate, the trees in the outer archipelago zone being stunted or assuming a creeping habit. The island Stora Träskön is an exception (cf. HUSTICH 1939, and NIEMI 1960), since it bears a luxuriant sprucewood of mainland character. As CEDERCREUTZ (1927:14) points out, the agricultural areas were cleared in earlier grass-herb woodland so that the latter type of vegetation is nowadays very sparse.

A third of the area (380.72 km²) consists of land under strong human influence (cultivated fields, meadows, pastures, roads and railways, yards etc.). Further particulars of the geography of Porkala can be obtained from the following studies: ROSBERG (1900, 1930); CEDERCREUTZ (1927:9—15, 1930); JOHANSSON (1930); R. PALMGREN (1930); A. BRENNER (1936a, 1953:15—24); BERGMAN (1939:1—11, 1945, 1957). Cf. also W. BRENNER'S studies on the vegetation in western Nyland (1921a) and on Barösund (1921b) and BERGMAN'S (1948) study on Esbo archipelago.

2. Earlier studies of the flora of the area

The knowledge of the hemerophilous flora of the tenancy area before 1944 is incomplete. CEDERCREUTZ' (1927) studies on grass-herb forest vegetation in Kyrkslätt and Esbo communes contain information on certain hemerophilous species. Brief references to the flora of Porkala are found in the following papers: M. BRENNER (1898), ROSBERG (1900), CEDERCREUTZ (1927, 1928, 1930 and 1945), W. BRENNER (1931), MARKLUND (1933), FAGERSTRÖM (1944a, 1945a and 1946), BERGMAN (1939, 1945 and 1957) and TÖRNROTH (1959). There are some specimens from Porkala in Herbarium Musei Fennici, Helsingfors (referred to here as *H*). Notes can also be found in HJELT'S (1888—1926) Conspectus. West of the area the hemerophilous flora was better known thanks to HISINGER'S (1855) and W. BRENNER'S (1921a and b) studies.

3. Earlier introductions of hemerochorous plants into Porkala

It seems possible that during the warm sub-Boreal period southern continental plants may have spread northwards in Europe with the »boat-axe culture» (cf. STERNER 1922: 316—317; FRIES 1958:49; SAARISALO-TAUBERT 1963a:103). JALAS (1957:17—20) considers it noteworthy that the southern continental element is well represented in the oak region in Finland, in the same area where the »boat-axe culture» occurred. Many southern continental plants, whose native status in southern Finland is not clear, are also found in Porkala, for instance, *Briza media*, *Arrhenatherum pubescens*, *Filipendula vulgaris* and *Artemisia campestris*.

Ancient human settlement seems to have favoured the distribution of some species, which nowadays grow spontaneously in the vegetation. By ancient castles, PETTERSSON (1943:35) has noted many species (e.g. *Chelidonium majus*, *Carum carvi*, *Heracleum sphondylium* ssp. *sibiricum*) which he considers probable archeophytes (cf. also JALAS 1958a:47 and SAARISALO-TAUBERT 1963a:110—114). During the time of the vikings and the Middle Ages, sea traffic used routes along the southern coast of Finland (cf. FLEEGE 1930:404; JAAKKOLA 1956:137; KERKKONEN 1959:19; ÖHMAN 1959:25; HAVUKAINEN 1963). Porkala goes by the name »Purkal» in a Danish-Estonian itinerary from the first half of the 13th century (cf. HAUSEN 1910:42) and is mentioned in Jakob Teitt's description of a voyage in 1556 (ÖHMAN 1959:25). Apparently the projecting peninsulas of Porkala formed convenient resting places during the voyages (JAAKKOLA 1956). The distribution of several species along our southern coast can be connected with these ancient sea routes (PETTERSSON 1942 and SAARISALO-TAUBERT 1963b), and this applies to the occurrence of *Allium oleraceum* and *Artemisia campestris* in Porkala. Apparently spontaneous occurrences of the species are found on the Porkala peninsula and along the previously mentioned long valleys.

A change must have occurred in the hemerophilous flora of the southern coast of Finland when Swedish colonists immigrated to the coasts of Nyland in the middle of the 13th century (JUTIKKALA 1958:15) and began agriculture and stock-raising. KERKKONEN (1945:270) considers that the colonists came from the Mälar area. However Marklund's (1964) studies on the disjunct distribution of *Ranunculus auricomus* ssp. *holanthus* indicate that the subspecies was hemerochorously introduced by colonists from the central part of Norrland into the coastal region of Nyland. We also know that commercial connections existed between Porkala and other lands. Old place names indicate communications with the Hanseatic Union, Estonia and the Finns (FLEEGE 1900:8—10).

The study area was inhabited during the Middle Ages and later by many »seafaring farmers» (Swed. »bondeseglare») (KERKKONEN 1959:130—133), and it is easy to imagine that large quantities of foreign diaspores were introduced with grain and fodder at that time. Surely many of the species favoured by old-fashioned habitations (LINKOLA 1917, 1933) have come to Finland in this way. For instance at Sjundby estate, which originates from the Middle Ages, one still can find *Chelidonium majus, Geum urbanum, Pastinaca sativa, Aethusa cynapium, Hyoscyamus niger* and *Carduus crispus*.

The number of foreign diaspores introduced with imported seed was greater earlier than nowadays, since there were not such effective methods of cleaning the seed. Many eastern species, in particular, entered Finland in this way (cf. LINDBERG 1903; LINKOLA 1916:327; LUTHER 1959:72), and this is probably the origin of many occurrences of *Bunias orientalis* and *Berteroa incana* in Porkala. The change to grass cultivation at the beginning of this century caused the appearance of a grass seed element (LINKOLA 1918b:10; JALAS 1958a:50; SAARISALO-TAUBERT 1963a:130—131) of which the following species, among others, have been noted in Porkala: *Cerastium arvense, Barbarea vulgaris, Thlaspi alpestre* ssp. *gaudinianum* and *Potentilla thuringiaca* ssp. *Goldbachii*.

Porkala has often been plundered or traversed by foreign contingents (FLEEGE 1930: 413—414 and 439; NUMMELIN 1930:633; A. BRENNER 1936b: 160, 194; 1953:326—332) and during the Great Northern War, 1700—1721, fugitives came from Estonia and Ingermanland. These events may also have left traces in the flora in the form of sweet herbs, medicinal plants, weeds and so on.

Russian troops were found in Porkala even before and during the First World War. Prior to the war, the Russian military force began to fortify Makilo (Mac Elliot, Mäkiluoto) and Stora Träskön. After 1918 the former was taken over by the Finnish Army. In 1944 the area was leased to the Soviet Union. The tenancy lasted for 11 years. 10,000—30,000 persons, the majority in military occupations, were stationed there (BERGMAN 1957:5). The transport of material, building activity and camp fires have influenced the vegetation, producing new habitats for many species which are intolerant of competition (cf. LUTHER'S (1948a:141—142) investigations on the Hangö peninsula). The garrison was large in proportion to the cultivated area (about 10 % of the agricultural area was cultivated during the tenancy according to BERGMAN), and was forced to import foodstuffs, a fact which favoured the introduction of foreign plants. Such recent eastern introductions could be recognized at the railway stations, around the harbours and at loading places, and were also readily identified in the new habitats created by the Soviet military. On the other hand it was naturally hard to decide the time of introduction of occurrences of eastern species, found in places influenced by earlier settlement. It is much easier to identify new-comers in virgin land than in countries where human settlement is of ancient date and hemerochores have been introduced during earlier centuries (FAGERSTRÖM 1957:116). In the latter cases, as in LUTHER'S (1948a) investigation of the Hangö peninsula, a previous knowledge of the flora of the area is most valuable.

III. The polemochorous flora

THELLUNG (1917) and KUPFFER (1922) studied plant dispersal caused by military movements during and after the First World War. Plants spread by military activity have been given the name polemochores (MANNERKORPI 1944:39, cf. also LUTHER 1948a: 142). PETTERSSON (1944) and LUTHER (1948a) have surveyed the polemochorous element in eastern Fennoscandia.

1. Traffic centres

a. The railway stations

Ever since their origin, the railways have been an important factor in the dispersal of the hemerochorous flora. Thus many adventive plants have spread inland from the harbours via the railways, for instance *Lepidium densiflorum* and *Senecio viscosus*. The importance of the railways as plant dispersers has been pointed out in many studies (e.g. HOLLER 1883, LEHMANN 1895, MATTHIES 1925, LITVINOVA 1926, MÜHLENBACH 1932, WIINSTEDT 1940, PEDERSEN 1955, ALMQUIST 1957, KREH 1960) being mentioned in Finland by i.a. LINKOLA (1918a, b, and 1920), HIDÉN (1922), PORKKA (1926), FAGERSTRÖM (1939—1940), LUTHER (1940), FAGERSTRÖM & JAHKOLA (1960) and MIKKOLA (1966). Thanks to the railways, many plants which could not travel far by natural means are dispersed over great distances. This type of dispersal has been called agestochory (cf. HEJNÝ 1958:333).

The vegetation at the railway stations is generally open. On the platforms are found the plant associations of trampled ground (cf. TUOMIKOSKI 1942 and BRUN-HOOL 1962). In the railway yards the plant associations have a ruderal character, specially at the loading platforms. The railway yards offer a favourable habitat to many southern species. They are usually very exposed to the wind and sun with high day temperatures, and consequent high evaporation. Often the ground consists of stones, sand and gravel, but has a lower layer of finer-particled material, as is revealed by the occurrences of *Taraxacum* (KREH 1960:89). Whirling dust, rich in nitrates, and cement and lime from broken sacks enrich the soil: the pH value lay around neutral (according to my measurements at the Kyrkslätt and Käla stations in Porkala in 1963, cf. also KREH 1960:89). These »artificial steppes» (KREH p. 87) serve as substrata for plants introduced with goods from southern territories.

The Helsingfors-Karis line was finished in 1903. Before 1918, when Finland had direct railway connections with the east, a great many species arrived at Finnish railway stations (LINKOLA 1920:21; HIDÉN 1922:89), but it is improbable that any unusual species from that time can have survived at the stations in Porkala. During the tenancy, railway traffic between Porkala and the Soviet was considerable: 3 trains travelled to and from the area each day (1 passenger and 2 goods trains). The traffic was even livelier when the area was being occupied and evacuated. My investigations began in 1957, i.e. in the second summer after the tenancy, when the adventive flora in some places still had an obviously eastern appearance. The following short description of the adventive eastern vegetation of the railway stations is mainly based upon my material from 1957—59 (see also pp. 25-26).

Kyrkslätt. The railway station was obviously used as a distribution centre during the tenancy. The station is the largest in Porkala both as regards area and the number of storehouses and loading platforms. The central part of the railway station comprised 4 storehouses and two separate loading platforms. South-east of the station were lines, which had led to a coal store. To the north was an engine-shed and another coal store. Here the waggons were probably cleaned, an important point when considering the dispersal of foreign species.

During the first excursions to Kyrkslätt in autumn 1957, I noted some species, which were not found the following summers: *Atriplex tatarica, Melandrium viscosum, Achillea nobilis* and *Artemisia siversiana*. These can be regarded as rare eastern immigrants in Finland.

In 1958—59 the eastern element was well represented in the railway stations in Porkala, but since then this element has begun to disappear. The species growing at Kyrkslätt railway station in 1958—59 comprised:[1])

Juncus compressus	pc	Melilotus officinalis	st cp
Puccinellia distans	pc	Trifolium campestre	pc
Rumex confertus	st pc	T. aureum	pc
R. thyrsiflorus	pcc	T. arvense	st cp
Melandrium album	cp	Astragalus sp. (cf. p. 41)	
Gypsophila muralis	pc	Malva pusilla	pcc
Brassica juncea coll.	pcc	Chaerophyllum aureum	pc
Sinapis arvensis	st cp	Verbascum nigrum	pc
Bunias orientalis	pc	Linaria (?genistifolia)	st pc
Berteroa incana	cp	Plantago media	sp
Barbarea stricta	pc	Galium mollugo	cp
Sisymbrium Loeselii	sp	Inula britannica	pc
Descurainia sophia	cp	Artemisia austriaca	st pc
Potentilla intermedia	st cp	A. absinthium	st cp
Medicago lupulina	cp	Centaurea scabiosa	pc
Melilotus albus	st cp	Cichorium intybus	cp

Salsola ruthenica, which was found at the railway station in 1962 probably also belongs to this polemochorous element.

Artemisia austriaca grew both at the central railway station by the loading platforms and behind the engine-shed on breeze. *Gypsophila muralis* and *Inula britannica* were observed in the latter locality.

Many different types of *Chenopodium album* (coll.) were found at the railway station; probably many of them were introduced from the east during the tenancy. MANNERKORPI (1944:45) recorded a similar occurrence in Uhtua.

Masaby. At the level crossing attention was attracted by a 5 × 10 m area, where *Trifolium arvense* and *Medicago lupulina* were dominant. Other species were *Melandrium album, Potentilla intermedia* and *Anchusa officinalis*. Appa-

[1]) cpp = very abundant, cp = abundant, st cp = fairly abundant, sp = scattered, st pc = fairly sparse, pc = sparse, pcc = very sparse.

rently waggons were cleaned here during the tenancy. In the loading area opposite the station house *Trifolium repens* was dominant and in some spots *Medicago lupulina* occurred abundantly together with *Poa compressa*. Here and there individuals of *Melilotus albus* and *M. officinalis* had reached a height of 2 m. In addition there were the following species which also often immigrate from the east: *Cerastium arvense* st pc, *Sinapis arvensis* st pc, *Bunias orientalis* st pc, *Berteroa incana* sp, *Descurainia sophia* sp, *Potentilla intermedia* sp, *Trifolium arvense* sp, *Vicia hirsuta* st pc, *Galium mollugo* cp, *Galium* sp. pc, *Anthemis tinctoria* pc, *Artemisia campestris* sp and *A. absinthium* st cp. The most interesting discovery was a specimen of *Primula farinosa* in a patch of *Medicago lupulina*. It is sometimes noted as an adventive and ballast plant in Finland.

Jorvas. During the tenancy 3 big loading platforms were built, which had fallen to pieces by summer 1959. Even in 1958 they were so dilapidated that only the pillars and some boards were left. These places, in which diaspores were concentrated, offered favourable habitats with suitable moisture conditions, a high temperature and a soil enriched by scattered lime. Most of the eastern species of the railway station were noted among and beside the ruins of the platforms:

Juncus compressus	sp	Descurainia sophia	st cp
Poa compressa	st cp	Potentilla intermedia	st cp
Apera spica-venti	st pc	Melilotus officinalis	sp
Bromus inermis	st pc	Trifolium aureum	pc
Cannabis sativa	st pc	Vicia hirsuta	st pc
Rumex obtusifolius	pc	Erodium cicutarium	st pc
Melandrium album	sp	Conium maculatum	st pc
Sinapis arvensis	cp	Pastinaca sativa	sp
S. arvensis v. orientalis	pc	Calystegia sepium	pc
S. alba	pcc	Lappula myosotis	st pc
Neslia paniculata	st pc	Galium Vaillantii	sp
Bunias orientalis	sp	Anthemis tinctoria	sp
Barbarea stricta	pc	A. arvensis	sp
Erysimum hieraciifolium	st pc	Artemisia absinthium	cp
Sisymbrium Loeselii	pc	Centaurea cyanus	pc
S. altissimum	sp	Cichorium intybus	sp
Camelina microcarpa	st pc		

Käla. The area around the rails had not been weeded since the tenancy. Among notable species may be mentioned *Echium vulgare* (by a now disused rail), *Camelina microcarpa* and *Medicago lupulina* (beside the line to Båtvik). The rail area in the station contained many immigrants from the east, such as *Sisymbrium officinale, Trifolium campestre, Euphorbia esula* and *Plantago media*.

Sjundeå. The eastern element in the flora of the station was concentrated on a stony loading platform opposite the station house. The following species were noted within an area of a few m²:

Poa compressa	cp	Dracocephalum thymiflorum	pcc
Rumex thyrsiflorus	sp	Plantago media	st pc
Cerastium arvense	sp	P. lanceolata	sp
Bunias orientalis	cp	Galium mollugo	cp
Potentilla intermedia	st cp	Anthemis tinctoria	st pc
Medicago lupulina	st cp	Artemisia absinthium	cp
Anthyllis vulneraria	pc	Cichorium intybus	st cp
Euphorbia esula	st cp		

In the goods yard south of the station *Deschampsia caespitosa* dominated with scattered patches of *Medicago lupulina*. Two occurrences of *Primula farinosa* were noted, 20 m from each other and the eastern *Alchemilla sarmatica* and *A. propinqua*. Beside the main line, between the station house and the level crossing, was a 5 × 15 m large carpet of *Carex praecox*. The size and purity of the stand suggest that it originated prior to the tenancy.

Solberg. Adventive eastern plants were found only by the loading platform east of the grain-cleaning works of Ingå Handelslag. *Bunias orientalis* and *Echium vulgare* were conspicuous at the loading platform. Mention may also be made of *Poa compressa* cp, *Rumex thyrsiflorus* sp, *Cerastium arvense* st cp, *Saponaria officinalis* st cp, *Potentilla intermedia* sp, *P. thuringiaca* ssp. *Goldbachii* st cp, *Plantago media* pc, *Anthemis tinctoria* st pc, *Artemisia absinthium* cp and *Cichorium intybus* cp. Close to the grain-cleaning works I noted, among other species, *Bromus secalinus*, which has immigrated with grain after the tenancy.

No noteworthy alien plants were found along the Soviet-built railway between Käla and Båtvik.

In order to get a better idea of the eastern element in the railway station flora in Porkala, the railway stations immediately outside Porkala were also investigated (Esbo, Köklaks, Täkter and Ingå). These are about the same size as the stations in Porkala. Here were noted eastern species such as *Potentilla intermedia* and *Lappula myosotis* (Täkter), *Bunias orientalis* (Esbo), *Cerastium arvense* (Köklaks), *Sinapis arvensis* (Ingå, Täkter) and *Trifolium arvense* (Ingå), but these often form part of the common flora of railway stations in southern Finland. An isolated occurrence of one or other of these species naturally need not indicate a direct introduction from the east.

The number of species at the railway halts is very low; here are found the commonest species of railway embankments, the special flora of trampled ground, weeds, and hemerobic species which have spread from the surroundings.

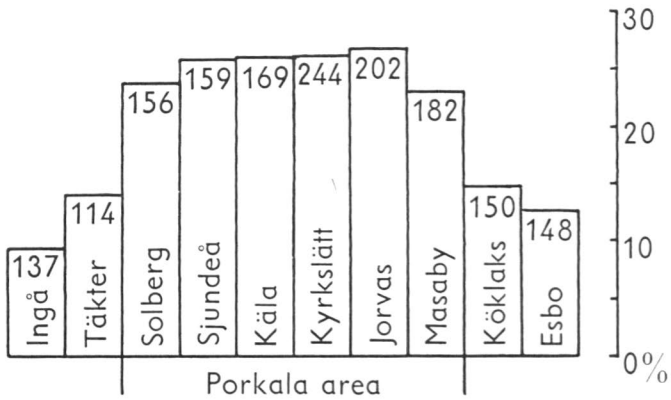

FIG. 2. The percentages of »eastern polemochores» in the station floras. The figures in the columns indicate the total number of species.

A survey of the flora of the railway stations. The numbers of species (1957—59) of the railway stations are shown in fig. 2. The stations outside Porkala have a lower number of species than the stations inside. The highest number, 244 species, was noted at Kyrkslätt, which had been an important traffic centre. The commonest weeds and ruderal plants and the indigenous hemerobic species which have spread from the surroundings, are more or less common at the different stations both outside and inside the study area (e.g. *Equisetum arvense, Festuca pratensis, Agrostis tenuis, Chenopodium album, Trifolium repens, Achillea ptarmica, Leontodon autumnalis* and *Taraxacum*). The less common adventive plants occur more frequently at the railway stations in Porkala.

If account is taken of the number of species at each station which have earlier been mentioned as members of the polemochorous eastern vegetation in eastern Fennoscandia (table 1, p. 45; cf. NIEMI 1966: 53), differences are revealed between the stations in and outside Porkala. The percentages of such species at the Porkala stations varied between 26.7 (Jorvas) and 23.1 (Masaby), while the corresponding percentages at the stations outside Porkala were 14.7 (Köklaks) and 9.4 (Ingå).

Most of the polemochorous eastern element was destroyed before long. In 1956 Docent Carl Cedercreutz (H) collected some species at the railway stations which I was unable to find there later on (cf. p. 26). When a new inventory of the flora of the railway stations was made in 1962—63, many species had disappeared. However *Potentilla thuringiaca* ssp. *Goldbachii* and *Echium vulgare* remained almost unchanged, while *Rumex confertus* and *Chaerophyllum aureum* had increased in abundance and spread locally.

b. The harbours

During the tenancy, harbours were built at Båtvik and Obbnäs. The railway ran from Käla station to Båtvik. It is difficult to ascertain how much was transported via the harbours during the tenancy. The fairly rich adventive flora at Obbnäs indicated rather lively traffic in the harbour during the tenancy, while the adventive flora at Båtvik was poor.

Obbnäs harbour. The harbour lies in a sandy area. Above the harbour area is a meagre pine forest. During the tenancy there was a loading place beside the harbour pier. In august 1959 I counted 39 flowering individuals and several leaf rosettes of *Echium vulgare*. The following were also noted within an area of 20 × 20 m:

Lychnis flos-cuculi	st pc	Euphorbia esula	sp
Melandrium album	sp	Hypericum perforatum	sp
Lepidium densiflorum	st cp	Galeopsis ladanum	pc
Berteroa incana	cp	Galium Vaillantii	st pc
Bunias orientalis	st cp	Erigeron acre	st pc
Descurainia sophia	sp	Artemisia absinthium	sp
Medicago lupulina	st cp	Senecio viscosus	cp
Melilotus albus	sp	Tragopogon pratensis	st pc

These immigrants were growing on sand together with *Phalaris arundinacea*, *Elymus arenarius* and *Cakile maritima*. *Rumex confertus* and *Lappula myosotis*, both good examples of eastern introductions, were recorded close to a road and *Erigeron canadense* was recorded north of the harbour area. South of the pier, on the shore meadow, in 1963, I found *Chenopodium glaucum* and a 8 × 4 m patch of *Achillea cartilaginea* growing on sandy ground, by the wrack which was farthest up the shore.

Båtvik. Few species of the harbour flora could be regarded with any certainty as eastern introductions. Among species recorded close to the harbour storehouses were *Polygonum amphibium* sp, *Melandrium album* st pc, *Malva moschata* pcc, *Pastinaca sativa* sp, *Artemisia absinthium* st cp, *Senecio viscosus* sp, *Tragopogon pratensis* sp. In 1956 Docent Carl Cedercreutz (H) collected *Sisymbrium altissimum*, but I could not find it in 1957. In 1962 Dr. Pekka Isoviita found *Oenothera biennis* on the slope above the harbour, an occurrence that neither Cedercreutz nor I had noted. Perhaps the species has immigrated via the railway since the tenancy, in connection with building undertaken by »Finska Kabelfabriken». It has earlier been established that the species is spread by the railways (cf. e.g. LUTHER 1940:15 and 1959:74, ALMQUIST 1957:242).

c. The airfield

The airfield, which was built east of Friggesby during the tenancy, has not been used subsequently. All the buildings were destroyed, the oil tanks were blown up and there was a considerable amount of debris. To the west of the airfield semicircular aeroplane shelters had been built. When the airfield was constructed many diaspores may have been introduced. There are, however, few records of diaspore dispersal by aeroplane (cf. ERKAMO 1948).

Epilobium adenocaulum was common along the roadsides west of the runway. Here I found *Apera spica-venti* together with *Secale cereale*. One individual of the eastern *Rumex pseudonatronatus* was also collected.

2. The settlement

In this description two categories of settlement are distinguished: Farms existing in Porkala before the tenancy and the Soviet settlement.

a. Farms existing before the tenancy

Practically all the agricultural settlement in the area is of ancient origin (cf. FLEEGE 1901, A. BRENNER 1936b and 1953). Around the farmhouses species favoured by old-fashioned habitations (LINKOLA 1917) occur locally in the flora, e.g. *Myrrhis odorata, Hyoscyamus niger, Inula helenium* and *Juncus compressus, Melandrium album, Sinapis arvensis, Sisymbrium officinale, Descurainia sophia, Erodium cicutarium, Conium maculatum* and *Pastinaca sativa*. Apart from the first three, they are also represented in the polemochorous vegetation in Porkala. Species which can be considered plants of old-fashioned habitations in the south of Finland also seem to be an integral part of the adventive element immigrating from the east. Accordingly, when dealing with the species growing around farms, it has been necessary to decide in which group they properly belong. Species recorded in places where eastern immigration was most obvious, e.g. Soviet loading places, have been considered polemochores which arrived during the tenancy.

During the tenancy soldiers were quartered in the farms. The cowhouses were made into dwelling-houses, and tank shelters were built in the vicinity. In some places eastern polemochores were still found, and some examples are given below.

Obbnäs. On the hill above the main building some floristic relics were found at a loading place, e.g. *Melandrium album* cp, *Echium vulgare* sp, *Hyoscyamus niger* pc, *Galeopsis ladanum* st pc, *Salvia verticillata* st pc and *Cichorium intybus* st cp. In addition the following species were recorded by the main building: *Apera spica-venti* cp, *Bunias orientalis* sp, *Anchusa officinalis* pc, *Erigeron acre* sp, *Cichorium intybus* st pc and *Allium oleraceum* st pc. The last-mentioned is, however, perhaps an old introduction from the time of the sailing-ships (p. 6).

Sundsberg. In the yard grew *Juncus compressus* st pc, *Puccinellia distans* pc, *Melandrium album* sp, *Bunias orientalis* st cp, *Conium maculatum* st pc, *Inula britannica* st pc and *Cichorium intybus* sp, the two last-mentioned plants have almost certainly immigrated during the tenancy. *Avena fatua* and *Hyoscyamus niger* grew behind a cow-house. These species are both favoured by long-standing human habitation, though the former probably very seldom occurs nowadays in Finland as a plant of old dwellings. Although they may both have established themselves a long time ago at Sundsberg, they are mentioned among eastern immigrants in earlier investigations (e.g. SÖYRINKI 1941, SAARNIJOKI 1942, ERKAMO 1943a, FAGERSTRÖM 1944b). On Estby plain in Kyrkslätt the newly returned inhabitants stated that *Avena fatua* had immigrated during the tenancy.

Junkars. Among the species found by the demolished Soviet houses below Junkars farm were *Rumex thyrsiflorus* st pc, *Papaver rhoeas* sp, *P. somniferum* st cp, *Sinapis arvensis* st pc, *Artemisia absinthium* cp and one individual of *Levisticum officinale.*

Biskopsböle. The owner Arthur Ramsay found that *Achillea cartilaginea* and *Cichorium intybus* had established themselves in his garden during the tenancy.

In *Ängsdal-Finnäs Geranium palustre* was a new-comer in the garden, according to the returned inhabitants.

At *Sjundby estate* I found two tussocks of *Carex vulpina* beside a store, and it seems that this species was also introduced during the tenancy. According to the owner of Sjundby estate, *Oenothera biennis* was introduced during the tenancy, but it was also mentioned at »Sjundeå Sjundby» by HJELT (1911:325). However, since the species is ephemeral, there is probably no connection between the two records.

As was mentioned earlier, it is sometimes very hard to decide if adventive plants are recent immigrants or if they were introduced at a much earlier date, for instance with the seeds of crop plants (*Avena fatua, Apera spica-venti, Melandrium album, Sinapis arvensis, Bunias orientalis*) or pasture plants (*Cerastium arvense, Potentilla thuringiaca* ssp. *Goldbachii, Galium mollugo*). As stated earlier, introduction with seeds is one of the principal ways in which diaspores have penetrated from the east.

b. The Soviet settlement

Soviet cantonments

The Soviet military was partly quartered in barracks, each cantonment consisting of 3—5 barracks. Dry pine forests were the sites preferred. During the investigations in 1958—59 an eastern element was readily recognised in the flora round the cantonments. For instance, at the cantonment by the military road between Båtvik and Pickala the following species were recorded: *Poa compressa, Rumex thyrsiflorus, Potentilla thuringiaca* ssp. *Goldbachii* and *Artemisia campestris. R. thyrsiflorus* was also noted by the cantonment NE of Edis.

The different cantonments provided a rather similar environment. The foundation of the barracks was made of cement, the walls of logs and boards (sometimes of bricks). The roof was covered by pine-shavings. At the transfer of the area the barracks were pulled down, and only the base remained.

Bricks, mortar, pine-shavings and other rubbish were left lying on the ground. Such a substratum has a very small moisture capacity. The light intensity was high owing to the light colour of the substratum, and the white-washed bases. In August and September 1963 pH measurements of such substrata gave results varying between pH 5.45 and 7.95.

These localities provided an opportunity to study the establishment and growth of plants on substrata of this type. In 1958—59 the ruins of 12 cantonments were investigated, and in 7 cases a new inventory of the flora was made in 1964. The investigations carried out in 1958—59 showed that the following species were found in 9 or more of the cantonments (the species marked with an asterisk were often dominant in the ruin flora, the figure relates to the number of occurrences):

Poa pratensis	12	*Barbarea vulgaris	12
*Deschampsia caespitosa	12	Trifolium repens	11
*Agrostis tenuis	12	T. pratense	12
Alopecurus pratensis	10	Vicia cracca	9
Phleum pratense	12	Epilobium adenocaulum	11
Elytrigia repens	11	Chamaenerion angustifolium	12
Salix caprea	11	Anthriscus silvestris	11
Urtica dioeca	12	Achillea ptarmica	9
Rumex longifolius	11	Achillea millefolium	12
R. acetosa	9	*Tripleurospermum maritimum v. inodorum	12
R. acetosella	12	Artemisia vulgaris	9
Polygonum aviculare	9	Tussilago farfara	10
Chenopodium album	9	Cirsium vulgare	12
Cerastium holosteoides	12	Leontodon autumnalis	12
Ranunculus acris	10	Taraxacum	12
R. repens	9		
Capsella bursa-pastoris	9		

Distinct seasonal aspects could be observed in the flora. In early summer the ruins shone with the yellow flowers of *Barbarea vulgaris*, at mid-summer they were white with flowering *Tripleurospermum maritimum v. inodorum*, while in autumn the predominating tone was the yellow-grey of withered *Deschampsia caespitosa* and *Agrostis tenuis*.

The ruin flora may have immigrated in different ways. It seems unlikely that hemerochorous dispersal has played a large role. On the other hand anemochores can travel long distances (cf., e.g. ERKAMO 1945), and chionochorous dispersal (ERKAMO 1943b) is also possible. Anemochores were well represented in the ruin flora. Among the plants which were common on the ruins, the following have a good capacity for anemochorous dispersal (cf. ROMELL 1938: 398): *Equisetum arvense, Salix* spp., species of the families *Betulaceae* and *Onagraceae* and genera of the family *Compositae: Tussilago, Senecio, Cirsium, Leontodon, Taraxacum* and *Hieracium*. In Viborg Erkamo (1943a:17) noted that anemochores were the principal constituents of the flora on the

higher ruin substrata. Apart from the above-mentioned plants, the small capsules and dry infructescences of several other species also spread anemochorously (cf. SAARISALO-TAUBERT's compilation, 1963a:82; species which spread very short distances have not been taken into account), for example several grasses, *Rumex* species, *Stellaria media, Cerastium holosteoides, Sagina procumbens, Anthriscus silvestris, Galium verum, Achillea ptarmica, A. millefolium* and *Artemisia vulgaris*. Among the anemochores, the occurrences of *Senecio viscosus* and *S. silvaticus* are remarkable. The former was found in two cantonments in the vicinity of important traffic routes (the cantonments N of Obbnäs and between Båtvik and Pickala), the latter species occurred in 6 cantonments.

Like the *Senecio* species, *Epilobium adenocaulum* and *E. rubescens*, with their effective anemochorous dispersal, readily colonize exposed ground. They were often found growing on very dry ruins. Probably they are able to survive severe drought in dry habitats thanks to their succulent basal shoots (during drought the individuals become small and very red).

The flora of the ruins seems to be partly of ornithochorous origin. Occurrences of *Sorbus aucuparia, Rubus idaeus* and *Solanum dulcamara* are surely a result of dispersal by birds (cf. ERKAMO 1943a:17). It is particularly remarkable that *Solanum dulcamara* grew and fruited luxuriantly on the hot, dry heaps of brick and mortar. The species normally occurs on moist soil in grass-herb forest vegetation, particularly near shores but is also found on dry hillsides, as for instance in the archipelago of SW Finland (EKLUND 1958:282). Occurrences on ruins are also known in central and western Europe. For example SALISBURY (1943) found it on ruins in London, and KREH (1955:75) mentions the species on the ruins of Stuttgart.

Other species, growing on the ruins have been mentioned as spreading endozoically with birds (e.g. *Polygonum aviculare, P. lapathifolium, Chenopodium album, Atriplex patula, Spergula arvensis, Carum carvi*, cf. SAARISALO-TAUBERT 1963a:87).

Myrmecochorous dispersal must also be considered in the case of plants spreading from the immediate surroundings. SAARISALO-TAUBERT (p. 86) attached only local importance to this means of dispersal. SERNANDER (1906: 203, cf. also ROMELL 1938:346) measured dispersal distances of up to 70 m. In the ruin flora there are many species whose diaspores Sernander (1901: 238—241) stated to be spread by ants, for instance *Luzula pilosa, Anthoxanthum odoratum, Chelidonium majus, Calluna vulgaris* and *Melampyrum pratense*.

It is possible that *Vicia* and *Lathyrus* have immigrated to the ruins autochorously (e.g. NORDHAGEN 1935:71, SAARISALO-TAUBERT 1963a:88—89). This means of dispersal is not very effective — ERKAMO (1943a:13) did not find species of these genera on the higher ruin substrata in Viborg (the ruins in Porkala were low, their height varying between 0.2 m and 2 m).

In the cantonments the following species were found in yards, but not, or only very rarely, on the ruin substrata: *Poa annua, Spergula rubra, Potentilla anserina* and *Plantago major.* These belong to the vegetation of trampled ground (TUOMIKOSKI 1942), and spread partly by adhering to footwear. In Viborg ERKAMO (1943a:13) found that *Plantago major* was almost as common on the higher ruin substrata as on the lower ones, Erkamo does not comment further on this observation. RIDLEY (1930:27—28) mentions that he has »seen or found recorded» *Plantago major* and other species growing on top of roofs and walls of a height of 12 feet. He considers that only the wind could have carried them to such places. Strong air currents would be required to carry diaspores of *Plantago major* (cf. ROMELL 1938:398). Endozoic dispersal with birds has also been recorded (HEINTZE 1918:41, cf. also SAARISALO-TAUBERT 1963a:87), epizoic dispersal is also possible since the seeds are adhesive. The seeds remain viable for many years (KORSMO 1926:190). The species has also been mentioned from bombed areas in Borgå (OLSONI 1944).

In the cantonments many species with high moisture requirements grew on wet places in the yards and were lacking or very seldom found on the ruins: *Juncus* spp., *Carex* spp., *Moehringia trinervia, Filipendula ulmaria* and *Bidens tripartita.*

In some places in the yards *Deschampsia caespitosa* had attained complete dominance. As a result, many species which are weak in competition were more abundant in the ruins than in the yards: *Urtica dioeca, Rumex longifolius, R. acetosa, Cerastium holosteoides, Trifolium repens, Lathyrus pratensis, Epilobium adenocaulum* and *Anthriscus silvestris.*

In order to study the subsequent development of the ruin flora, a new inventory was made in 1963 at 7 of the cantonments. Already a change in the appearance of the ruin flora could be observed; *Betula verrucosa, B. pubescens* and *Salix caprea* formed high patches of scrub. Between these *Calamagrostis epigeios* and *Chamaenerion angustifolium* were dominant (both had increased in abundance). The 7 new inventories showed that the following species had increased in frequency (the first figure represents the number of ruin areas in which the species was found in 1958—59, the second their number in 1963): *Poa compressa* 2,5; *Calamagrostis epigeios* 3,6; *Salix phylicifolia* 2,4; *Cirsium palustre* 2,4.

In 1963 the following species were recorded as new in the ruin flora (not seen in 1958—59): *Festuca rubra, Poa palustris, P. trivialis, Deschampsia flexuosa, Salix aurita, Rosa* sp., *Prunus padus, Melampyrum pratense* and *Plantago major* (for the last-mentioned species, however, see above).

These increases are, however, much less significant than the retrogression of other species. For instance, the following species which were found on 5 or more ruins (out of 7) in 1958—59, were not found at all in 1963: *Polygonum*

aviculare, Ranunculus repens, Odontites verna and *Sonchus arvensis*. Of the 124 species recorded in these 7 ruin areas (in 1958—59) 58 species could not be found in 1963. Moreover 27 species had obviously decreased in frequency, e.g. (first figure ruin areas in 1958—59, second in 1963): *Chenopodium album* 5,1; *Alopecurus pratensis* 6,2; *Rumex acetosella* 7,2; *Achillea ptarmica* 6,2; *Cirsium vulgare* 7, 1. In 1958—59 124 species were recorded in the 7 areas, but in 1963 the total number was only 73.

In central and western Europe investigations have been made on the plants colonizing bombed areas, for instance in London (SALISBURY 1943 and LOUSLEY 1944), Stuttgart (KREH 1955) and Freiburg (WILMANNS & BAMMERT 1965; lists given of literature on the flora and vegetation of ruins). KREH separated 3 phases of colonization (waves): the first is characterized by annuals, in the second perennials attain dominance, while the third is marked by the arrival of trees and bushes. When I made an inventory of the ruin areas in Porkala in 1958—59 perennials had already established themselves, but many annuals still remained (the species in parentheses may also be autumn annuals, according to HIITONEN 1933):

Polygonum aviculare
Chenopodium album
(Stellaria media)
Raphanus raphanistrum
(Capsella bursa-pastoris)
(Rorippa islandica)
(Erysimum cheiranthoides)
(Vicia hirsuta)
(Viola arvensis)
(Myosotis arvensis)
Galeopsis bifida
Galeopsis speciosa
Odontites verna
Euphrasia officinalis coll.
Gnaphalium uliginosum
Matricaria matricarioides
Sonchus oleraceus
S. asper

None of these species was found when the new inventory was made in 1963, while forest plants and trees had become established; afforestation will gradually take place.

Stables

In connection with the last Finnish wars several studies were made of the flora growing around the stables of Soviet troops (cf. SÖYRINKI 1941, MANNERKORPI 1943 and 1944, LUTHER 1948a). In modern warfare horse forage may be transported from distant countries (e.g. LUTHER 1948a:148, HEIKKINEN 1959:58—59), and contain many hippochores (MANNERKORPI 1944:50). During the lease of the Hangö peninsula in 1940—41 the Soviet forces were obliged to import forage from the Soviet Union, since the poor soil of the district could not produce sufficient forage. Subsequently LUTHER (1948a) recorded many new polemochores in the stable-yards.

Although one would not expect much forage to be imported in an agricultural district like Porkala, the obviously eastern flora around the stables at Edis and Obbnäs suggest that imports were in fact made.

At Edis (about 3.5 km south of Kyrkslätt railway station) a stable for about 40 horses had been built in a gravelly slope. Only the gravel walls with logs on top remained with an entrance at one end. There had been windows along one side, but now all that was left were holes in the gravel wall. Close to these were 1 m high plants of *Rumex confertus* which is a typical representative of the eastern element (PETTERSSON 1944:72, ERKAMO 1965) as well as species which have proved to be characteristic of the polemochorous vegetation in other parts of Porkala: *Poa compressa* st pc, *Rumex thyrsiflorus* st cp, *Bunias orientalis* st cp, *Potentilla intermedia* st pc, *Medicago lupulina* sp, *Plantago lanceolata* st cp, *Cichorium intybus* cp and *Artemisia absinthium* cp. Fodder had probably been thrown through the holes, and the alien diaspores which were scattered in the process were able to establish themselves owing to lack of competition. At the stable at Obbnäs the following species were recorded: *Herniaria glabra*, *Silene tatarica*, *Saponaria officinalis*, *Gypsophila muralis* and *Artemisia campestris*. At other Soviet stables in the area the flora had no clear eastern features.

Tank shelters

Tank shelters had been built in the area, usually at some distance from the living quarters. These were roofed-in shelters intended for the parking and repair of military vehicles. It seems unlikely that a mechanized army should disperse plants, but at the tank shelters south of the place where the road forks to Böle on the Porkala peninsula, I found *Carex hirta*, *Artemisia absinthium* and *Cichorium intybus*. Perhaps diaspores adhere to sticky oil barrels or are introduced with hay packed around spare parts. *Carex hirta*, which is indigenous to or very old in Åland and the south-western archipelago of Finland, has been recorded earlier on the southern coast around Russian barracks (FAGERSTRÖM 1958b), and as a plant introduced with ballast (for instance LUTHER 1940:10; MÄKINEN & LAINE 1961:205). The occurrences of the two last-mentioned species in the area are mostly of polemochorous origin, dating from the time of the tenancy.

The remaining Soviet settlement

During the tenancy, schools, hospitals, laundries, factories etc. were built. In some of these places adventive eastern plants could still be found in 1958—59.

At the Soviet schools in Kantvik, *Descurainia sophia* and *Epilobium hirsutum* were recorded. At a hospital between Kantvik and Getberg I found

Papaver somniferum, *P. rhoeas* and *Senecio viscosus*, while *Epilobium adenocaulum* and *E. rubescens* were remarkably abundant in the moist yard.

There had been a garage in the vicinity of the Obbnäs road, north of Lilltträsk. Immediately outside the entrance to a Soviet building grew *Achillea cartilaginea*, a characteristic species of the eastern element (e.g. LUTHER 1948a:150—151; JALAS 1958a:48). On an adjacent rubbish-heap the following species were noted:

Poa compressa	sp	Vicia angustifolia	pc
Silene cucubalus	sp	Epilobium adenocaulum	st pc
Melandrium album	pc	E. rubescens	pcc
Saponaria officinalis	st pc	Convolvulus arvensis	pc
Bunias orientalis	st pc	Artemisa campestris	sp
Descurainia sophia	sp	A. absinthium	st cp
Potentilla intermedia	sp	Cichorium intybus	sp
Melilotus officinalis	pc	Tragopogon pratensis	st pc
Vicia hirsuta	pc		

A bakery with storehouses had been built in the neighbourhood of Obbnäs, south of Ängvikträsk. Along the wall of the northern storehouse I counted (10. 8. 1959) c. 150 plants of *Achillea cartilaginea* and 2 tussocks of *Briza media*. *Juncus compressus*, *Chenopodium rubrum*, *Sisymbrium officinale* and *Lotus corniculatus* grew by another wall in the yard.

3. The fortified islands

Even before the tenancy the larger islands in the Porkala archipelago had been under human influence. Rönnskär and Makilo (= Mac Elliot, Mäkiluoto) are old anchorages (cf. FLEEGE 1900:76; SEGERSTRÅLE 1945:169). During the First World War the Russians fortified Makilo and Stora Träskön. In the last wars the Finnish military occupied these and other islands, and was replaced during the tenancy by Soviet forces. It is thus very difficult to ascertain the provenance of the hemerochores.

On ground where the vegetation had been worn away, *Juncus effusus*, *J. conglomeratus* and *Senecio silvaticus* were abundant in some places. *Epilobium adenocaulum* and *E. rubescens* grew remarkably luxuriantly in moist places such as wayside ditches and rock crevices. FAGERSTRÖM (1944a, 1945a) recorded these species from Porkala even before the tenancy. Similar records were made on the Hangö peninsula after the last wars (LUTHER 1948a:151).

On Bylandet in Stora Mickelskären, a patch of *Bromus inermis* covered several m². Occurrences of *Ribes nigrum* in several rock crevices are possibly of eastern origin (cf. LUTHER 1948a:153). *Plantago media* and *Digitalis purpurea* had come to Järvö during the tenancy according to the newly returned inhabitants.

In 1932 Kaarlo Linkola collected *Melandrium noctiflorum* on Rönnskär in the garden of the lighthouse-keeper (H); this is a typical eastern immigrant from the time before the last wars. *Impatiens glandulifera* seems to have come to Rönnskär during the tenancy as an ornamental plant (or as a weed).

On Makilo the adventive flora was richer, but the variegated history of the island makes it difficult to determine the time of introduction of the different species. Several species were noted which are common eastern immigrants: *Poa compressa, Bunias orientalis, Sisymbrium officinale, Descurainia sophia, Lappula myosotis, Plantago media, Achillea cartilaginea* and *Cichorium intybus*. On the other hand, *Papaver rhoeas*, which has mainly been recorded as a »German plant» (cf. p.34), grew on the plain above Makilo harbour. *Alchemilla murbeckiana*, which was collected by Makilo harbour, has a north-western distribution in Fennoscandia. Thus both eastern and western elements could be distinguished in the flora of Makilo.

In 1958 I counted about 15 individuals of *Potentilla rupestris* beside the ruined artillery tower of Makilo, in 1963 only one was found (Mr. Chr. von Frenckell, who lived for 3 years on Makilo before the tenancy, could not remember this conspicuous species).

In areas which have long been under human influence, the proportion of hemerochores in the flora has increased. Ulvinen (1921) found that 30 % of the species in the flora of Sandhamn were hemerochorous. Hidén (1921:155) considered that 47 % of the species of Sveaborg were of hemerochorous origin. I made an inventory of the flora of Stora Träskön in the Porkala area (Niemi 1960) and compared the results with the records Hustich (1939) had given for the flora of the island before the last wars. According to Hustich's species list, 11 % of the species at that time were of hemerochorous origin (my calculation), while my inventory made after the tenancy showed that the hemerochorous percentage had increased to 21. Among new species on Stora Träskön were the following 13, which had either been introduced by the Finnish forces during the last wars or by the Soviet forces during the tenancy: *Festuca pratensis, Phleum pratense, Polygonum persicaria, Raphanus raphanistrum, Capsella bursa-pastoris, Barbarea vulgaris, Descurainia sophia, Potentilla norvegica, P. intermedia, Trifolium hybridum, Galeopsis speciosa, Galium mollugo* and *Matricaria matricarioides*.

4. Other places with disturbed or destroyed vegetation

Military activity inflicts great damage on the natural vegetation. This was noticed especially near the border of the tenancy area. Bunkers, trenches and machine-gun nests were found in several places as well as camping-sites. The largest devastated areas were found on the islands used as shooting targets

and in the burnt forests. According to BERGMAN (1957:3—4), the vegetation on such islands in summer 1956 mostly consisted of *Chamaenerion angustifolium*, *Rubus idaeus* and small *Betula* plants, species which rapidly colonize burnt ground (cf. PETTERSSON 1931:134). In 1958—59 the burnt areas had the red-brown hue of the mosses *Ceratodon purpureus*, *Funaria hygrometrica* and *Polytrichum juniperinum*. In these areas hemerochores were generally lacking. Some examples of areas where the balance of the vegetation had been disturbed and new hemerobes (JALAS 1953 and 1955) had immigrated, are given below.

The camping-place NE of Störsvik was in a CT forest. The substratum was sand, the field layer had consisted of *Arctostaphylos uva-ursi*, *Vaccinium vitis-idaea* and *Calluna vulgaris*. The pine-forest had been felled, but rejuvenation had been good. The tents had left large, round patches devoid of vegetation, and in the surroundings the vegetation had been destroyed by motor vehicles. Here I recorded (17. 9. 1958) the following aliens:

Poa pratensis	sp	Vicia tetrasperma	pc
P. compressa	sp	Chamaenerion angustifolium	st cp
P. nemoralis	st cp	Plantago major	st cp
Deschampsia caespitosa	sp	Gnaphalium silvaticum	st pc
Agrostis tenuis	cp	G. uliginosum	pc
Alopecurus pratensis	pc	Achillea millefolium	st cp
Phleum pratense	st pc	Tripleurospermum maritimum	
Polygonum aviculare	st pc	v. inodorum	sp
Spergula arvensis	st cp	Matricaria matricarioides	sp
S. rubra	st pc	Leontodon autumnalis	st cp

The site is marked by a paucity of species; *Cruciferae* species are lacking, and *Poa compressa* is the only species which commonly characterizes eastern polemochorous vegetation in Porkala.

Alien plants were rarely noted close to bunkers, trenches and machine-gun nests; hemerobic species which had immigrated from the surroundings mostly grew in these places. For instance close to a machine-gun nest upon a hill E of Strand in Degerby grew *Poa pratensis* st cp, *P. nemoralis* st cp, *Deschampsia caespitosa* st pc, *Phleum pratense* sp, *Stellaria graminea* sp, *Chamaenerion angustifolium* sp and *Achillea ptarmica* st pc, i.e. species which often characterize habitats influenced by human activity in Porkala.

The disturbance in the balance of the vegetation has favoured some hemerophilous species. *Juncus effusus* and *J. conglomeratus* have already been mentioned (p. 21). These two species are spread rapidly by boots and motor-vehicles, especially vehicles with caterpillar belts which have an effect similar to that of sowing-machines. The species spread so successfully on the Hangö peninsula during the Soviet tenancy that LUTHER (1948a:151) speaks of a »*Juncus*-invasion» which was clearly of Russian provenance. *Senecio silvaticus* which is spontaneous on the southern coast of Finland on hills and in sandy

places, is also a rapid colonizer of places where competition is absent owing to erosion of the natural vegetation (cf. KUPFFER 1922:8, HJELT 1926:148, LUTHER 1961a). In Porkala the species occurs principally south of the railway, particularly in places where the vegetation has been worn away by the military. It was not observed on the railway embankments or at the stations, although such habitats ought to be suitable (cf. PORKKA 1926:237, FAGERSTRÖM 1939—1940:136).

After the tenancy *Epilobium adenocaulum* and *E. rubescens* were common in Porkala. They occurred, like the earlier-mentioned species, in places where competition was lacking, particularly on moist ground in the vicinity of human settlement, and also on gull-skerries. These, species originating in America, and nowadays dispersed over the greater part of central and northern Europe, were found in Finland at the beginning of the century. PIISPALA (1964) has dealt with the spread and distribution of the species in Finland.

Immigration took place unnoticed and establishment occurred in places where human influence was not strong, so that these occurrences were earlier described as spontaneous (cf. HIITONEN 1938, FAGERSTRÖM 1941 and 1944a:35). During and after the last wars both *Epilobium* species increased vigorously on the southern coast of Finland (FAGERSTRÖM 1944a and b, 1945a, 1953). LUTHER (1948a:151) describes their immigration to the Hangö peninsula during the Soviet tenancy, but according to him the provenance of the invasion was not clear.

After the tenancy of Porkala both the species were common (c. 100 occurrences of *E. adenocaulum* and c. 55 of *E. rubescens*) on ground devoid of vegetation. The construction of fortifications and new roads, the clearing of woodlands and the transport of war munitions must certainly have been of decisive importance for the rapid spread of the species in the area. In suitable habitats both the species formed thick patches; in a 50 × 50 cm plot on the shore at Obbnäs I counted (1958) 61 individuals of *E. adenocaulum* (shoots), which had reached an average height of 80 cm.

There were c. twice as many occurrences of *E. adenocaulum* in the area as of *E. rubescens*. Both the species seem to have the same soil requirements, and the quantity of seed set is about the same. On the other hand the seeds of *E. rubescens* are more often defective (material from the tenancy area 1958—59). Moreover the seeds of *E. adenocaulum* are more easily borne by the wind (Dr. Bror Pettersson, personal comm.). Perhaps these biological details affecting dispersal partly explain the differences in the frequences of the species.

Epilobium adenocaulum and *E. rubescens* very probably also spread hemerochorously, for instance epianthropochorously, but anemochorous dispersal is, as has been mentioned, very effective. As regards the arrival of the species in Finland, PIISPALA (1964:41) considers that they have probably immigrated

from Estonia. Among other evidence for this theory she cites the occurrences in the archipelago, but it also seems possible that the species may have spread to the islands from hemerobic habitats on the Finnish mainland.

5. Ornamental plants cultivated by the Soviet inhabitants during the tenancy

Fruit bushes and ornamental plants were cultivated in the Soviet cantonments. In summer 1958, when I first studied the flora in these cantonments, the yards were overgrown by other species, but several perennials still remained. *Ribes spicatum*, *R. nigrum* and *R.uva-crispa* had been particularly popular. Possibly fruit bushes had been transplanted from gardens in the area. *Ribes nigrum* especially is said to be an important part of the provisions of the Soviet forces (cf. LUTHER 1948a:153).

In the Soviet cantonments in Porkala the following cultivated plants were noted:

Hemerocallis sp.
Lilium bulbiferum
Iris pseudacorus
Rheum rhaponticum
Saponaria officinalis
Aquilegia vulgaris
Paeonia sp.
Hesperis matronalis
Rosa rugosa
Crataegus sp.
Lupinus polyphyllus
Althaea rosea
Syringa vulgaris
Veronica teucrium
Solidago canadensis coll.
Rudbeckia sp.
Calendula offcinalis

According to the inhabitants of Porkala the following new plants were found in their gardens after the tenancy:

Lilium bulbiferum
Dianthus barbatus
Aquilegia vulgaris
Delphinium sp.
Anemone sp.
Dictamnus albus.
Eryngium planum
Digitalis purpurea
Veronica teucrium
Rudbeckia sp.
Doronicum sp.

6. Changes in the polemochorous flora during the study period

The eastern element that had entered the area during the tenancy decreased during the study period. By autumn 1957 when I first visited the area many polemochores had certainly disappeared. M. Jahkola and U. Kiistala collected

an undetermined *Astragalus* species at Kyrkslätt railway station in 1958 which I was later unable to find. The owner of Kockby farm in Degerby found *Zea mays, Fagopyrum esculentum* and *Helianthus annuus* in his yard after the tenancy, in 1956, but these cultivated plants had already disappeared by the following summer.

Docent Carl Cedercreutz, found the following species (H) in summer 1956, although I did not observe them in the same localities between 1957 and 1963 (st = railway station):

Chenopodium glaucum	Jorvas st, Masaby st,
C. rubrum	Jorvas st,
Herniaria glabra	Masaby st, Käla st,
Gypsophila muralis	Masaby st,
Brassica juncea	Käla st,
Sisymbrium altissimum	Båtvik harbour magazines,
Lithospermum arvense	Obbnäs,
Helianthus annuus	Käla st.

I found all these species in other places in Porkala, with the exception of the last-mentioned. They are all annuals (or autumn annuals), except for *Herniaria glabra*. It appears that annuals in particular were much better represented at railway stations in Porkala in the summer following the cessation of Soviet traffic than in subsequent years. However, REPO (1949:70) observed in Petroskoi that the adventive plants did not decrease until the second year after the cessation of Soviet traffic.

During the summers after the tenancy the polemochores in Porkala decreased gradually (particularly at the railway stations). When making a new inventory in summer 1963, I did not find the following 26 species which I had noted at the end of the 1950's (*only found at railway stations):

*Cannabis sativa	Geranium palustre
Rumex pseudonatronatus	Malva moschata
Chenopodium rubrum	*M. pusilla
*Atriplex tatarica	*Primula farinosa
Herniaria glabra	*Dracocephalum thymiflorum
Silene tatarica	*Stachys annua
*Melandrium viscosum	*Linaria (?genistifolia)
Gypsophila muralis	*Galium sp.
*Brassica juncea coll.	Inula britannica[1]
*B. ?nigra	Anthemis tinctoria
*Sinapis alba	*Achillea nobilis
*Alchemilla sarmatica	*Artemisia austriaca
*A. propinqua	*A. siversiana

[1]) *Inula britannica* was however found again at Kyrkslätt railway station in summer 1966.

In 1963 the 21 species mentioned below were looked for in vain in some earlier recorded localities (but still appeared in others):

Avena fatua	Jorvas st,
Apera spica-venti	Jorvas st, Obbnäs farm,
Rumex obtusifolius	Jorvas st,
R. thyrsiflorus	several localities
Papaver rhoeas	»
P. somniferum	»
Sinapis arvensis	»
Lepidium ruderale	Käla st, Sjundeå st,
Neslia paniculata	Jorvas st,
Sisymbrium Loeselii	Jorvas st,
Camelina microcarpa	Jorvas st,
Anthyllis vulneraria	Sjundeå st,
Geranium pratense	Solberg st,
Erodium cicutarium	Jorvas st,
Conium maculatum	Jorvas st,
Anchusa officinalis	Masaby st,
Lappula myosotis	Jorvas st, Obbnäs harbour, Makilo,
Glechoma hederacea	Kyrkslätt st,
Galeopsis ladanum	Jorvas st, Bondarby farm,
Anthemis arvensis	Jorvas st,
Achillea cartilaginea	Makilo

Some of the more noteworthy eastern polemochores found in 1963 in all the earlier known localities were:

Puccinellia distans	Melilotus officinalis
Briza media	Trifolium aureum
Carex vulpina	T. campestre
C. praecox	Euphorbia esula
C. hirta	Epilobium hirsutum
Rumex confertus	Oenothera biennis
Cerastium arvense	Chaerophyllum aureum
Bunias orientalis	Pastinaca sativa
Berteroa incana	Convolvulus arvensis
Sisymbrium officinale	Salvia verticillata
Descurainia sophia	Plantago media
Potentilla thuringiaca	P. lanceolata
ssp. Goldbachii	Artemisia campestris
Medicago lupulina	Cichorium intybus
M. falcata	Crepis biennis

In summer 1966 (21. 7.) I found some species at Kyrkslätt railway station which I had not found there earlier: *Briza media*, *Sagina nodosa* and *Linum catharticum*, all in one group, and further on *Stellaria aquatica*. It is possible that the three first-mentioned species have earlier been overlooked and belong to the polemochorous eastern element. The increased transport activity after the tenancy period, however, has obviously enriched the flora of Kyrkslätt station with new alien elements. *Stellaria aquatica* might be one of them.

7. Distribution groups

The polemochorous eastern element in Porkala is presented in table 1. On the basis of the distribution and occurrence of the species in eastern Fennoscandia several groups can be distinquished.

1. Species also occurring spontaneously in southern Finland:

Juncus compressus
Carex vulpina
C. hirta
Briza media
Poa compressa
Rumex thyrsiflorus
Melandrium viscosum
Trifolium aureum
T. arvense
Geranium palustre
Primula farinosa
Glechoma hederacea
Artemisia campestris
Plantago lanceolata

2. Species which are spontaneous in northern Finland:

Rumex pseudonatronatus and *Silene tatarica.*

3. Pronouncedly eastern species found in eastern Fennoscandia:

Epilobium hirsutum
Alchemilla sarmatica
A. propinqua
Inula britannica
Achillea cartilaginea
Crepis biennis

4. Uncommon adventive species in Finland:

Rumex confertus
Salsola ruthenica
Atriplex tatarica
Brassica juncea
B. ?nigra
Chaerophyllum aureum
Salvia verticillata
Achillea nobilis
Artemisia austriaca
A. siversiana

5. Species which have fairly often been noted as adventive plants in Finland:

Cannabis sativa
Herniaria glabra
Sinapis arvensis
Neslia paniculata
Berteroa incana
Sisymbrium Loeselii
S. altissimum
Camelina microcarpa
Potentilla intermedia
Medicago lupulina
M. falcata
Melilotus officinalis
Melilotus albus
Trifolium campestre
Euphorbia esula
Convolvulus arvensis
Echium vulgare
Anchusa officinalis
Lappula myosotis
Dracocephalum thymiflorum
Galeopsis ladanum
Plantago media
Helianthus annuus

8. Earlier history of introduction into Finland

1. *Species favoured by old-fashioned habitations* (cf. LINKOLA 1917, 1933 and, for instance, GRANÖ 1953 and SAARISALO-TAUBERT 1963a).

The following species, which form part of the polemochorous eastern element in Porkala, have also been noted around old-fashioned habitations, such as old farms in the area:

Puccinellia distans
Melandrium album
Sisymbrium officinale
Descurainia sophia
Erodium cicutarium
Conium maculatum

The eastern polemochores in Porkala *Chenopodium glaucum, C. rubrum, Lepidium ruderale* and *Malva pusilla* have not been noted as »plants of old-fashioned habitations» in the area, but records of their occurrences in southern Finland as a whole, indicate that they should be classified in the above group. The two last-mentioned species are rather common constituents of polemochorous eastern vegetation in eastern Fennoscandia. The earlier cultivated *Pastinaca sativa* and *Artemisia absinthium* also belong to the above-mentioned group.

2. *Old cereal weeds.*

Many of the species nowadays described as adventive plants in Finland, occurred earlier in fields sown with Russian seed, for instance

Avena fatua
Apera spica-venti
Melandrium album
Cerastium arvense
Bunias orientalis
Berteroa incana
Potentilla thuringiaca ssp. Goldbachii
Medicago lupulina
Melilotus albus
M. officinalis
Trifolium arvense
Neslia paniculata
Euphorbia esula
Pastinaca sativa
Convolvulus arvensis
Lithospermum arvense
Lappula myosotis
Echium vulgare
Stachys annua
Galeopsis ladanum
Dracocephalum thymiflorum
Plantago media
Helianthus annuus
Cichorium intybus
Crepis biennis etc.

(cf. LINDBERG 1903 and LINKOLA 1916:221). All the above species were recorded in Porkala as polemochores introduced during the tenancy, but I did not observe them growing as weeds in cultivated fields. However many of these species, for example *Berteroa incana* and *Bunias orientalis* have long been found in the area and occur by house walls, ramps leading to haylofts, outhouses and in similar localities.

3. *Species known to be introduced with seeds of pasture plants* (LINKOLA 1918b, JALAS 1958a, SAARISALO-TAUBERT 1963a:130).

Cerastium arvense, Potentilla thuringiaca ssp. *Goldbachii* and *Galium mollugo* were observed in Porkala before the tenancy, but many records, among others from Soviet loading places, point to the fact that the species form part of the introduced polemochorous element.

4. *Plants which have earlier been cultivated* (cf. ELFVING 1897, HINTIKKA 1928 and 1933, LUTHER 1959 and SAARISALO-TAUBERT 1963a: 115—119).

Saponaria officinalis, Geranium pratense, Malva moschata and *Cichorium intybus* were earlier cultivated in gardens in Porkala, but were also introduced by Soviet traffic during the tenancy. Of these, *Saponaria officinalis* and *Cichorium intybus* have several times been noted at Soviet loading platforms and by the Soviet settlement.

5. *Interesting species of uncertain origin.*

In this group may be numbered *Carex praecox, Potentilla rupestris, Alchemilla nebulosa, Lathyrus tuberosus, Oenothera biennis* and *Levisticum officinale* (see the list of species).

IV. List of species

The nomenclature is according to Hylander (1955), except *Achillea cartilaginea* Led.

The list contains the more remarkable species, which have been noted in polemochorous eastern vegetation, or in some other way can be connected with the tenancy. All older records known to me, are cited first, and are separated by a dash from records made after 1955. If no older records have been found, the dash follows immediately after the specific name. An asterisk (*) before the locality indicates that the occurrence is regarded as polemochorous and originating from the tenancy. Localities without an asterisk indicate older occurrences or occurrences whose origin is uncertain. The names of the communes are indicated by their initials: Kyrkslätt = *K*, Sjundeå = *S*, Degerby = *D* (the last-mentioned forms part of the present commune of Ingå). Other contractions: farm = f, railway station = st, railway halt = h. The initials (ÅN) after the name of a person whose records are found in the list of species indicates that I also found the species in the same place. H = record in Herbarium Musei Fennici in Helsingfors Univ. Dep. Bot. Oulu = Herbarium of the University of Oulu. TUR = Herbarium, Botanical Institute of the University of Turku.

Juncus compressus. K: Thorsvik (road), 1932, N. Herlin (H). — *K:* *Masaby st; *Jorvas st; Kyrkslätt st; Makilo on trampled ground; *Smedsede at Obbis store; *Soviet barracks S of Edö; *Soviet bakery S of Ängvikträsk; Gillobacka f; Hindersby-Åminne f; Munkkulla f; Strömsby f; Sundsberg f; *S:* Käla st; Grefvas-Heicka f; Käla f; Sjundby estate; *D:* Berg f; Sigurds f; Degerby church village. (Also spontaneous occurrences in the outer archipelago). — In settled areas the species is found in hemerobic habitats such as yards and roadsides where it can perhaps be considered a plant of old-fashioned habitations (cf. FAGERSTRÖM 1958a). The polemochorous occurrences are found at loading platforms with an obviously eastern flora.

Zea mays. — *D:* *Kockby f, in the yard in summer 1956 according to the farmer.

Lolium perenne. K: Masaby »lawn», 1904 Rich. Frey (H). — *K:* Kyrkslätt st; Kyrkslätt close by the church; Kyrkslätt parsonage; *Obbnäs Soviet stable; Jorvas Koivumäki lawn; Gillobacka — Jorvas in several places along the roadside; *S:* railway between Sjundeå st and Vik h; Käla f; railway between Sjundeå st and Göks h; *D:* Bergkulla f; Klevbacka f. — The species is spread with the seeds of pasture and lawn plants, but occurs also in ruderal habitats. In eastern Fennoscandia the species has three times earlier been noted in polemochorous eastern vegetation.

Poa compressa. — 40 occurrences, of which 16 may be considered polemochorous, originating from the tenancy. The species is found at railway stations, sometimes along railways, at Soviet loading places, and in rock meadows[1] which are not far removed from some centre of human activity. None of my records can be regarded as clearly indigenous. Nevertheless, LINKOLA (1943:53) mentions indigenous occurrences from Esbo. W. BRENNER (1921b) does not mention the species from Barösund archipelago. According to EKLUND (1946:180, 1958:154), the indigenous occurrences are found on basic substrata, but such habitats are very uncommon in Kyrkslätt (cf. CEDERCREUTZ 1927:11). The species seems to be indigenous at least in the archipelago of southern Finland on rock-ledges and rocky hills (LINKOLA 1943:48, 53). Traffic, particularly on the railway has favoured the dispersal of the species (cf. LINKOLA 1943:50, ALMQUIST 1957:256).

Poa palustris. — 20 occurrences, principally at railway stations, along railways (together with *P. nemoralis;* here it was difficult to draw a clear dividing line between the two species) and at Soviet loading places. The species thus belongs to the polemochorous eastern element.

Puccinellia distans. K: Strömsby (HJELT 1895:430). — *K:* *Kyrkslätt st, Strömsby f, roadside; Sundsberg f, roadside.

Briza media. K: Strömsby, stony hillside at Heikovik croft, 1888 M. Brenner (H, HJELT 1895:407); Getberg, cultivated, 1913 P. H. Lindberg (H); CEDERCREUTZ (1927:106 and 1945:175) mentions other, non-adventive occurrences in Kyrkslätt. — *K:* *Strömsby, at Soviet barracks E of the Obbnäs road; *Soviet bakery S of Ängvikträsk; Kyrkslätt st, found for the first time in 1966, perhaps the species was earlier overlooked. (I also noted a probably indigenous occurrence at Hirfsala, Brändö, at the head of a cove).

Avena fatua. — *K:* Kyrkslätt st, 1958 M. Jahkola & U. Kiistala (H); *Jorvas st; *Kärras f; *Oppibacka f; *Rilaksholm f; Sundsberg f; *Säfvalls f. — In Porkala the species has spread to a certain extent on the Estby plains, where it was introduced during the tenancy. *A. fatua* is nowadays less common in consequence of the cleaning of seed grain (cf. JALAS 1958b), and its seeds are generally not allowed in tested grain (HILLI 1963:6).

Apera spica-venti. K: Vårnäs, 1860 M. Brenner (H). — *K:* *Jorvas st; *Friggesby airfield; Obbnäs f; *D:* Skräddars-Smeds f. — The species is an old, nowadays rather uncommon, cereal weed and also forms part of the adventive Soviet element.

Agrostis gigantea. K: Kantvik, 1894 K. Holmberg (H); Thorsvik, shore, 1911. I. Majantie (TUR); — *K:* Hirsala, Tavastö, on the NW shore of the island, 1959 L. Kivekäs (H); Hila, Haukipää, stony seashore, 1961 A. Turunen (OULU);[2] Kyrkslätt st; Jolkby f, lawn; Strömsby, on a ley; Porkala Byviken f; Gillobacka, at Soviet barracks; Ragvalds f; Sarfvik, on an embankment by Jorvas road; *S:* Käla st; Pickala, at a Soviet factory; *D:* Degerby church village; Kocksby, in a sandpit. — The species is also spread with the seeds of pasture and lawn plants. The individuals I found at the railway stations were tall and broad-leaved, and grew together with several remarkable eastern polemochores. Perhaps *A. gigantea* is part of the adventive eastern element.

Bromus inermis. — *K:* Masaby st; Jorvas st; Kyrkslätt st; railway N of Gillobacka träsk; Stora Mickelskären, Bylandet; *S:* railway between Vik and Ängsby h; railway 1/2 km W of Käla st; do. 1/2 km E of Käla st; railway N of Vikträsk; Störsvik, Mellangård f; *D:* Solberg st. — None of the occurrences is clearly connected with the tenancy; however *B. inermis* is a typical adventive eastern plant (e.g. ERKAMO 1967).

Carex vulpina. — *S:* *Sjundby estate, some tussocks close by a storehouse.

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[1]) In this study the words »rock meadows» mean meadow patches upon rock.

[2]) The list given by Mr. K.-G. Widén.

C. praecox. S: Pallas, Solbacken, shore meadow, 1938 Ärla Backman (H). — *S:* Sjundeå st, a rather large patch ca. 100 m E of the station building. — It is possible that the large carpet at Sjundeå station derives from the time before the tenancy. The species has often been recorded as an adventive eastern plant (ERKAMO 1958, 1967), many records are from railway stations (e.g. Dragsvik, Ekenäs etc., acc. to H).

C. hirta. — *K:* *Soviet tank shelters beside Porkala road S of Böle fork (p. 18).

Cannabis sativa. — *K:* *Jorvas st, at a Soviet loading platform (not found since 1960).

Rumex confertus. — *K:* *Kyrkslätt st; *Obbnäs harbour; *Edis, by the Soviet stable. — In Porkala the species thrives in three different places (observations from 1958 to 1963) and seems to be spreading locally. It has also been able to persist elsewhere in Finland (cf. PETTERSSON 1944:72, FAGERSTRÖM & JAHKOLA 1960:57, MÄKINEN & LAINE 1961:206). The first occurrence found in Finland was on Sandhamn (1919) where it had been introduced with fodder by the Russian troops (HIDÉN 1927). Hidén also mentions it as a Russian immigrant on Sveaborg 1921, in Viborg and Terijoki 1925. OLSONI (1937) found the species on Lavansaari (Ka) close by old Russian batteries. He (1927) also considers that an occurrence at Strömma canal (Kimito, Ab) is of Russian origin. *R. confertus* is mentioned as occurring among polemochorous Soviet vegetation at Viborg (ERKAMO 1943a), Hangö Peninsula (FAGERSTRÖM 1944b, LUTHER 1948a), Uhtua (MANNERKORPI 1944), Petroskoi (FAGERSTRÖM & LUTHER 1945) and Kuhmo (FAGERSTRÖM 1957), cf. also ERKAMO (1967). KUPFFER (1922:19) mentions *R. confertus* growing at Riga among Russian polemochores which had travelled considerable distances. The species originates from the southern and central parts of the European Soviet (REGELIS 1936:94). In central Europe the species has a distinctly eastern distribution (TRZCIŃSKA-TACIK 1963:76). It is one of the most characteristic species of the eastern flora element.

Rumex pseudonatronatus. — *K:* *Friggesby, Soviet airfield (observed only in 1958). — The species occurs indigenously along the coast of the Gulf of Bothnia (Linkola 1942: 11). In Soviet Karelia, where it occurs along watercourses, it has begun to spread to habitats influenced by human activity (cf. KALELA 1943a). Before the last wars *R. pseudonatronatus* had not been clearly identified as a »Russian plant» (LINKOLA 1942); perhaps earlier occurrences indicating an eastern origin had been overlooked (ERKAMO 1943b:8), but according to LINKOLA (1942) it is obvious that it has spread hemerochorously from the east. For example in Kouvola, where the species has spread extensively, it is considered to be of Russian origin (cf. SILKKILÄ 1943 and 1944, ULVINEN 1949:197). During and after the last wars *R. pseudonatronatus* was found several times in polemochorous eastern vegetation.

R. obtusifolius. K: Näse h, close by the road, 1940 H. Buch (H); *S:* Ljungarskulla, near Fågelvik, ditch-bank (v. *obtusifolius*), 1944 Gunnar Marklund (H). — *K:* *Jorvas st; Nägels f (*t*); Estby, Solhem in garden; storehouse NW of Masaby st (*t*); *S:* Pickala, refuse heap (*t*); Grefvas-Heicka f; (my records marked with (*t*) belong to v. *transiens* Simonkai, Prof. Jaakko Jalas, personal comm.).

R. thyrsiflorus. — *K:* *Kyrkslätt st; *Edis, Soviet stable; *Soviet barracks NE of Edis; *Junkars, Soviet barracks; *Soviet barracks S of Obbnäs f; Strömsby f, garden; Danibacka, roadside; Kolsarby, Tallbacka f; rock meadow S of Ytterkurk f; *S:* *Sjundeå st; *Soviet barracks between Båtvik and Pickala; *D:* *Solberg st; Kopparnäs f. — Many polemochorous occurrences have been recorded (Soviet storehouses and loading places, close to barracks), but occurrences on dry hillsides in rock meadows as at Danibacka, Tallbacka and Ytterkurk may be of older origin. In the east of Finland *R. thyrsiflorus* is fairly common (e.g. KALELA 1943a and 1943b:20, HUSTICH 1943:43, FAGERSTRÖM 1945b: 135, JALAS 1965a). EKLUND (1927 and 1958:191) is of the opinion that occurrences on

Korpo in the south-west archipelago are indigenous and the result of dispersal from Estonia. It is found on the Hangö peninsula (FAGERSTRÖM 1944b and LUTHER 1948a) and in Kuhmo (FAGERSTRÖM 1957) in polemochorous Soviet vegetation.

Polygonum amphibium. — *K:* Railway bank W of Masaby st; Kyrkslätt st; Båtvik, storehouses by harbour; *S:* railway bank N of Vikträsk; railway bank between Käla and Båtvik; Störsvik, Mellangård f; Pickala, refuse heap.

Fagopyrum esculentum. — *D:* Kockby f, common in the farmyard the first summer after the tenancy (personal communication from the owner).

Chenopodium album. Various records from Porkala (H). — Common on soil modified by human activity. At Kyrkslätt st unusual types of the species were found (great variation in the laciniation of the leaf) which had probably immigrated during the tenancy.

C. polyspermum. K: Humaljärvi, arable land, 1928 Kurt Wallden; Humaljärvi, Dalkulla garden, 1913 H. Wasastjerna; Thorsvik, villa Haga, 1913 Th. Saelan; Sigurds, 1920 Torild Brander (all 4 in H). — *K:* *Kyrkslätt st; Kyrkslätt, new elementary school, yard; Kyrkslätt, close to the church; arable land N of Kyrkslätt st; Kolsarby, in garden and in a potato patch; Ytterkurk, fallow field; *S:* fallow field E of Käla st. — Apart from one polemochorous occurrence, the species is found as a weed and ruderal plant in the area.

C. glaucum. K: Humaljärvi, Dalkulla, garden, 1913 H. Wasastjerna (H). — *K:* Jorvas st and Masaby st, 1956 Carl Cedercreutz (H); *Obbnäs harbour; Kyrkslätt st (the last-mentioned occurrence was found in 1965 by Mr. Guy Hällfors, in 1966 I recorded the species as rather common in the same place). — In southern Finland the species has been favoured by old-fashioned habitations, but the occurrences in Porkala probably originate from the tenancy. The occurrence at Kyrkslätt st may earlier have been overlooked.

C. rubrum. — *K:* Jorvas st, 1956 Carl Cedercreutz (H); Kyrkslätt st, 1958 M. Jahkola & U. Kiistala (H); *Soviet bakery S of Ängvikträsk (still found in the last-mentioned locality in 1962 but not in 1963).

Atriplex tatarica. — *K:* *Kyrkslätt st, summer 1957. — This adventive eastern plant, which is uncommon in Finland, has been found at railway stations, by harbours and close to mills (H, and e.g. FAGERSTRÖM 1939—1940:110, MÄKINEN & LAINE 1961:211). LUTHER (1948b:84) found it by Toppila harbour (Oulu/Uleåborg) where it had probably been introduced with Soviet grain.

Salsola ruthenica. — *K:* *Kyrkslätt st, summer 1962. Although the record was made so recently, the occurrence appears to originate from the tenancy.

Stellaria aquatica. — *K:* Kyrkslätt st, close to a Soviet storehouse (first found in 1966).

Cerastium arvense. K: Sigurds, sandy hill, 1908 Einar Brander; Thorsvik, villa Haga, in garden, 1913 Th. Saelan; villa Paersch, in garden, 1916 Th. Saelan (all 3 in H). — *K:* *Masaby st; *Obbnäs harbour; *Båtvik harbour; *Strömsby, close to Obbis store; *Soviet storehouse NE of Finnträsk; Sarfvik, close to Jorvas road; Smedsede f, rock meadow by the yard; Nägels f, yard; Lill-Nägels, hillside close to the yard; *S:* *Sjundeå st; railway by Sjundby river; *D:* *Solberg st. — The species had penetrated the area even before the tenancy, probably being introduced with the seeds of pasture plants, but it is also part of the polemochorous eastern element in Porkala.

Sagina nodosa. Records of indigenous occurrences in the archipelago are found in H. — *K:* Kyrkslätt st, loading area S of the station (first found in 1966).

Spergula rubra. K: Getberg, 1910 P. H. Lindberg and 1912 Signhild Lindberg; Sigurds, 1920 Torild Brander, (all 3 in H). — 26 occurrences on trampled ground, at railway stations and on roadsides.

Herniaria glabra. — *K:* Masaby st, 1956 Carl Cedercreutz (H); *Obbnäs Soviet stable; *S:* Käla st, 1956 Carl Cedercreutz (H). — The occurrences in Porkala are probably of

Soviet origin. In 1958 I did not find the occurrences recorded by Cedercreutz. It was still found at Obbnäs in 1962 but not in 1963. Earlier the species was recorded as an eastern polemochore (table 1). In Finland the species is found on old military drill-grounds, among others in the barrack areas of Hämeenlinna/Tavastehus and Mikkeli/St. Michel but also on trampled ground in heavily frequented areas and as an adventive plant (H).

Silene cucubalus. K: Vårnäs, 1859 M. Brenner (H). — 39 hemerochorous occurrences, of which 4 are probably polemochorous and date from the tenancy. Some occurrences at Soviet loading places indicate introduction from the east, while occurrences in farm gardens and parks show that in Porkala *S. cucubalus* has favoured old habitations. (A shore type occurs indigenously in the archipelago.)

S. tatarica. — *K:* *Obbnäs, by a Soviet stable (found between 1958 and 1962, but not in 1963). — The types found in Porkala were similar to the types introduced into Lappvik by the Soviet military during the tenancy of the Hangö peninsula. The appearance of the types, which have spread to southern Finland differs to some degree form that of the types occurring in northern Finland, where indigenous occurrences are found along the edge of watercourses (VASARI 1965). Originating from the steppes and forest steppes, this species has spread to eastern Fennoscandia from both the SE and NE (KALELA 1949:17). Besides occurring in northern Finland it grows in Soviet Karelia (cf. AARIO 1942:225, HUSTICH 1943:26, 43, PALMÉN 1943:76).

Melandrium viscosum. — *K:* *Kyrkslätt st (1 specimen in autumn 1957). — As an adventive plant *M. viscosum* is very rare; HJELT (1906:14) mentions one record: Ab Uusikaupunki/Nystad 1 individual in a yard on ballast 1893. KUPFFER (1922:19) and LITVINOVA (1926:61) also considered the species to be introduced from distant territories. In the Finnish archipelago there are seemingly indigenous occurrences on the outer skerries, and the species is found in other archipelagos in the Baltic (cf. e.g. STERNER 1922:292, PALMGREN 1927:25, 153, EKLUND 1958:205, map 35, SKULT 1965) where it has been considered a steppe relic from the sub-Boreal period (STERNER 1922, KUPFFER 1925:176), though a hemerochorous origin has also been attributed to the occurrences in the Baltic (cf. MEUSEL 1943:400 and SAARISALO-TAUBERT 1963a:108).

M. album. K: Sigurds, 1919 Torild Brander; Porkala, Rönnskär, 1932 K. Linkola. — 46 occurrences, of which 12 appear to be polemochorous. — It occurred at railway stations, as an adventive plant by Soviet habitations and loading places, in gardens and farmyards. The species is typical of the adventive eastern element (table 1), but the occurrences by older habitations in Porkala show that it has occurred in the area for some time.

Saponaria officinalis. K: Thorsvik, Klobbsund, 1913 Th. Saelan (H). — 39 occurrences, of which 4 appear to be polemochorous. It is found in gardens, parks, and yards as well as in waste places and by Soviet loading places. As in the case of the preceding species, there are at least two types of occurrences in the area: polemochorous eastern occurrences and occurrences around old habitations.

Gypsophila muralis. S: Pickala, 1852 H. Nervander (HJELT 1906:43); *D:* Degerby, shore, 1885 W. Grönholm. — *K:* Masaby st, 1956 Carl Cedercreutz (H); *Kyrkslätt st, 1956 Carl Cedercreutz (H) (ÅN); *Obbnäs, Soviet stable; *D:* Kopparnäs, roadside 1962 (Mr. Kalevi Keynäs, personal comm.); Billskog, rock meadow influenced by human activity, on a path, 1960 Harri T. Toppari (H).

Papaver rhoeas. — *K:* *Junkars f, at Soviet barracks; *Smedsede, at Soviet barracks; *Ediis, at Soviet barracks; *do. between Smedsede and Strömsby; Obbnäs f; *Soviet hospital in Getberg; Makilo yard above the harbour. — It has been recorded as a Soviet plant in at least 4 places. However, *P. rhoeas* has chiefly been recorded as a »German plant» in Finland (VIDLUND 1947, LUTHER 1948b, VALOVIRTA 1949, cf. also KUPFFER 1922).

P. somniferum. — *K:* *Kyrkslätt st; Makilo, yard above the harbour; *Junkars f, at Soviet barracks; *Soviet barracks between Smedsede and Strömsby; *Soviet hospital in Getberg; *S:* *Soviet barracks N of Störsvik. — As with *P. rhoeas*, almost all the occurrences had disappeared when the new inventory was made in 1962—1963 (now *P. somniferum* is cultivated in gardens in Porkala).

Brassica juncea. — *K:* *Kyrkslätt st; *S:* Käla st, 1956 Carl Cedercreutz (H).

Brassica ?nigra. — *S:* *Käla st, loading area (the only specimen found was so defective that the determination is somewhat uncertain).

Sinapis arvensis. K: Sarfvik, arable land, 1908 Einar Brander. — *K:* *Jorvas st, 1956 Carl Cedercreutz (H) (ÅN); *Masaby st; *Kyrkslätt st; railway E of Kyrkslätt st; Båtvik railway track, 1956 Carl Cedercreutz (H); Kyrkslätt, refuse heap close to the church; *Junkars f, Soviet barracks; *Soviet house in the forest E of Gunnarskulla f; Gunnarskulla f; Hindersby-Åminne f; Smedsede f, in potato patch; Nägels f; Lill-Nägels f; *S:* *Käla st; — Nowadays the species is a rather uncommon weed in Finland, but it is also part of the polemochorous eastern element. *S. arvensis* has often been found in polemochorous eastern vegetation in eastern Fennoscandia (table 1).

S. arvensis v. orientalis. — *K:* *Jorvas st, at a Soviet loading platform.

S. alba. — *K:* *Jorvas st, at a Soviet loading platform (last found in 1959).

Lepidium densiflorum. — *K:* Railway bank Käla-Båtvik, 1956 Carl Cedercreutz (H); Masaby st, 1956 Carl Cedercreutz (H); Obbnäs harbour. — The species is common at all railway stations in Porkala. Perhaps it spread to Obbnäs during the tenancy.

L. ruderale. — *K.* Hirfsala f, courtyard, 1960 Teuvo Ahti (H); *S:* *Sjundeå st, loading platform; *Käla st. — In southern Finland the species is a plant of old-fashioned habitations, but in Porkala the occurrences at the loading places, at least, must be due to immigration during the tenancy. The species is also found in the Kyrkslätt archipelago on gull skerries, to which it has been carried by gulls from the surroundings of the capital (cf. NIEMI 1967 and 1968).

Neslia paniculata. — *K:* *Jorvas st, 1956 Carl Cedercreutz (H) (ÅN); *S:* Pickala, in a refuse pit; *D:* Solberg st, at Ingå Handelslag's seed-cleaning works. — The species is one of the most frequent eastern polemochores in eastern Fennoscandia (table 1).

Bunias orientalis. K: Kyrkslätt (HJELT 1906:393); Medvastö, yard, 1900 Runar Collander (H). — 34 occurrences, of which 4 can definitely be considered to be polemochorous and date from the tenancy. The species is found at railway stations, by farms close to outhouses, by Soviet habitations, and especially at loading places. *B. orientalis* is an old grain weed in Porkala, but has also been introduced during the tenancy.

Berteroa incana. — *K:* *Masaby st; *Kyrkslätt st; railway E of Tolls h; do. 250 m W of Tolls; *Obbnäs harbour; *Obbnäs, Soviet stable; *Soviet stable at place where the road forks to Strömsby; Lill-Nägels f; *S:* *Sjundeå st; railway 400 m E of Käla st; *Käla st; Käla f; Sunnanvik, Rånäs (Mrs. Marita Rosengren, Ph. mag., personal comm.); *D:* Kämpbacka, Nygård f. — There are also older occurrences, and this is probably an old weed, like the former species (cf. e.g. LINDBERG 1903, LINKOLA 1916:327).

Armoracia rusticana. K: Löfholm, 1860 Magnus Brenner (H). — *K:* Kyrkslätt st, in the loading area; *S:* Soviet barracks N of Käla st. — The species is often cultivated but is also found as a garden escape.

Barbarea vulgaris. K: Fasa, arable land, 1906 Th. Saelan (H). — Very common throughout the area on ground influenced by human activity (more than 100 occurrences), growing in fields, yards, around buildings, along railways, at railway stations and especially remarkable on the ruins of Soviet barracks.

Erysimum hieraciifolium. — *K:* Jorvas st; Kyrkslätt st; Kyrkslätt, close to the church; railway track between Getberg and Jeppas; Hirfsala f in the margin of the yard, meadow close to the shore, 1960 T. Ahti (H); Makilo; Stora Träskön; Järvö; *S:* Käla st. — On the islands Makilo and Järvö there was a large type of the species with protruding siliques. This type came to the yard on Järvö during the tenancy, according to the inhabitants. It should be pointed out that this does not include *E. cheiranthoides* ssp. *altum* Ahti (AHTI 1962). (*E. hieraciifolium* also occurs fairly frequently on skerries in the outer archipelago of Kyrkslätt, in the higher wrack zone (cf. e.g. BORG 1967, NIEMI 1968) and in the epilittoral).

Sisymbrium Loeselii. — *K:* *Jorvas st; *Kyrkslätt st. The Jorvas occurrence was not found in 1962.

S. altissimum. — *K:* Båtvik, railway track, 1956 Carl Cedercreutz (H) (not found by me in 1957); *Kyrkslätt st; *Jorvas st.

S. officinale. K: Vårnäs, 1860 M. Brenner (H). — *K:* *Kyrkslätt st; Makilo; *Obbnäs, Soviet barracks close to the harbour; *Soviet barracks S of Obbnäs f; *Soviet bakery S of Ängvikträsk; Porkala Mellangård f; *S:* *Käla st; Sjundby estate; *D:* Kårs f; Kockby f; Strand f. — In Porkala *S. officinale* is one of the species which are favoured by old-fashioned human habitations, a fact indicated by occurrences in old farm gardens. The species is also part of the polemochorous element introduced from the east during the tenancy.

Camelina microcarpa. — *K:* *Jorvas st; *S:* *Käla st, east of the station yard. The Jorvas occurrence was not found in 1962.

Descurainia sophia. K: Vårnäs, 1860 M. Brenner; Kyrkslätt farm (»gård»), 1882 R. Faltin; Thorsvik, Klobbsundet, 1913 Th. Saelan (all 3 in H). — Masaby st; *Jorvas st; Kyrkslätt st; *Obbnäs harbour; *landing-stage SE of Obbnäs f; *Obbnäs f; *Soviet barracks above Obbnäs harbour; Kyrkslätt centre; *Soviet habitations N of Lillträsk; *Soviet schools in Kantvik; Getberg f; Gunnarskulla f; Makilo; Stora Träskön; *S:* *Käla st. — As with *S. officinale*, the occurrences of this species originate both from the tenancy and from an earlier period.

Potentilla rupestris. — *K:* Makilo, at the ruined artillery tower (in 1958 ca 15 individuals, in 1963 only 1). — In Finland the species has earlier been found in Ekenäs 1908 (HJELT 1919:82) and recently in Ta Tampere/Tammerfors, Pyynikki, Jooselinniemi, in a park, 1963 Matti Kääntönen (H). There is also a record from Ka Viipuri/Viborg, 1891 (HJELT 1919).

P. intermedia. K: Getberg h (HJELT 1919:92). — 15 occurrences, of which 11 appear to be polemochorous dating from the tenancy. The species is found at railway stations, by harbours, and by Soviet habitations, and there are a few records from farms. This is a common species of Finnish railway stations, but is also very frequent in adventive eastern vegetation.

P. thuringiaca ssp. *Goldbachii. K:* Masaby, railway, 1933 B. Färdig; Masaby, Framnäs f, 1941 Alvar Palmgren; (both in H). — *K:* Smedsede, rock meadow; gravel pit between Masaby and Smedsby; *S:* *Soviet barracks between Båtvik and Pickala; *D:* *Solberg st, loading platform. — The species has spread to Finland with hay seed (e.g. SAARISALO-TAUBERT 1963a:130), but is also part of the adventive eastern element (e.g. ERKAMO 1944:159, and 1967). In Porkala the occurrences in rock meadows probably originate from earlier introductions with hay seed, while the adventive occurrences are due to recent introductions from the east.

Alchemilla. The main part of the material was checked and determined by the late Dr. Gunnar Marklund, *A. nebulosa* by Kaija Saarisalo, Ph.lic.

A. sarmatica. — *S:* *Sjundeå st (not found in 1962).

A. propinqua. — *S:* *Sjundeå st (not found in 1962).

Both the above-mentioned species seem to grow spontaneously in the SE corner of Fennoscandia (cf. SAMUELSSON 1943:47—48, 64; HIITONEN 1946:112—113). The occurrences in other parts of eastern Fennoscandia seem to be of hemerochorous origin (H). BUCH (1940) points out that *A. sarmatica* has been brought to Borgå, Haiko, with Russian grain. The occurrences of *A. propinqua* in Ostrobottnia Kajanensis seem to be largely of polemochorous origin, the species having been introduced with Russian forage (JALAS 1965b), but it is also mentioned as a »German plant» in Hyrynsalmi by HEIKKINEN (1959: 61).

A. obtusa. K: Ingels (ROSBERG 1900:109); Tera, 1907 Harald Lindberg; CEDERCREUTZ (1927) does not mention occurrences from southern Kyrkslätt though he writes that the species is occasional in the northern parts of the commune. Later he (1945) mentions an occurrence in *S:* Pickala. — *K:* Båtvik harbour; Soviet barracks N of Båtvik; *S:* Sjundby estate, in garden; *D:* Solberg, close to Lillungs f, roadside.

A. murbeckiana. K: Kyrkslätt, lawn, 1895 G. Holmberg (H). — *K:* Makilo, waste ground above the harbour.

A. nebulosa. — *S:* Göks f, roadside. — No traces of Soviet activity were observed. The occurrences of this species are hemerochorous except for those in the SE corner of Fennoscandia (cf. SAMUELSSON 1943:90, JALAS 1965c). After the tenancy of the Hangö peninsula, LUTHER (1918a:156) found it at Lappvik st, where it has been able to persist (observed by me in 1966).

Lupinus polyphyllus. — Common in the area, more than 60 records. — The species was originally cultivated in gardens but has spread considerably and now grows in inhabited areas, along roadsides, in harbours and at railway stations. The fact that it also grows around Soviet habitations indicates that it was cultivated during the tenancy.

Medicago lupulina. — *K:* Båtvik, by an old habitation, 1956 Carl Cedercreutz; Thorsvik f, courtyard, 1958 Liisa Kivekäs (H) (*w*); *Kyrkslätt st, close to Soviet habitations 300 m SE of st, 1958 M. Jahkola & U. Kiistala (H) (*g*), (ÅN) (*g*); *Masaby st (*g*); *Jorvas st (*g*); *Kyrkslätt st; *Obbnäs harbour (*g*); *Båtvik harbour; Getberg f (*g*); *Smedsby f; *Edis, Soviet stable; *Soviet barracks between Edis and Strömsby; *Soviet habitation E of Gunnarskulla f; Brinkeberg f (*g*); *S:* *Käla st, 1956 Carl Cedercreutz (H) (*g*), (ÅN) (*w*); *Sjundeå st (*g*); *Soviet barracks S of Sjundby estate (*g*). — It is one of the characteristic species of the polemochorous Soviet element in Porkala. The records marked with (*g*) relate to v. *glanduligera* Neum. and records marked with (*w*) to v. *willdenowiana* Koch (cf. JALAS 1960; specimens determined by Prof. Jaakko Jalas).

Medicago falcata. — *S:* *loading place E of Käla st.

Melilotus albus. — *K:* *Kyrkslätt st; *Masaby st; *Jorvas st; Getberg h; *Obbnäs harbour; Biskopsböle f; *S:* *Käla st; *Sjundeå st.

M. officinalis. — *K:* Masaby st, 1956 Carl Cedercreutz (H) (ÅN); *Jorvas st; *Kyrkslätt st; *Obbnäs harbour; *Soviet barracks close to Obbnäs harbour; *Soviet habitations N of Lillträsk; *Smedsby f; *Soviet habitation E of Gunnarskulla; Biskopsböle f; *S:* Käla st, railway, 1956 Carl Cedercreutz (H) (ÅN); *Sjundeå st; Käla f; Störsvik, Mellangård f; Störsvik, Östergård f.

Neither of the *Melilotus* species had decreased when the new inventory was made in 1962—1963. The occurrences, which were largely concentrated in Soviet loading places, show that the two species are a common feature of the polemochorous vegetation in Porkala, as also of the polemochorous Soviet vegetation in eastern Fennoscandia (table 1).

Trifolium campestre. K: Tolls, ditch-bank, 1930 Jorma Soveri (H). — *Masaby st; Kyrkslätt st; *Häggisböle, Västangård f; *S:* *Käla, railway, 1956 Carl Cedercreutz (H) (ÅN); *Sjundeå st; *D:* *Solberg st.

T. aureum. K: Smedsby (CEDERCREUTZ 1927); Sigurds, 1919 Torild Brander (H); *S:* Sjundeå, 1870 G. A. af Hällström (H); — *K:* *Jorvas st; *Kyrkslätt st; *Soviet barracks at Junkars cross-roads; Dåvits, close to Hirfsala road; Lill-Kanskog, close to Porkala road, rock meadow; Skrobbs f, yard; Böle, close to Porkala road, rock meadow; Brinkeberg f; *S:* Göks h; railway 1/2 km E of Käla st; *D:* Klevbacka f, in rock meadow. — Occurrences in rock meadows, influenced by human activity, apparently originate from a period prior to the tenancy, while occurrences at Soviet loading places appear to be of polemochorous origin.

T. spadiceum. K: Porkala (CEDERCREUTZ 1927); Sarfvik, 1908 Einar Brander; Sarfvik, shore meadow, 1909 Signhild Lindberg; Getberg, meadow margin, 1910 Per Harald Lindberg; Sigurds, 1918 Torild Brander; Mobacka, Abr. Montin; *S:* Käla st, meadow, 1932 N. Herlin (all 6 in H). — *K:* Kyrkslätt st; Getberg h; railway between Getberg and Jeppas; Kyrkslätt parsonage; *S:* Käla st; railway between Getberg and Käla; do. between Käla and Ängsby; do. between Sjundeå and Göks; do. W of Sjundeå st.

T. arvense. K: Thorsvik, Klobbsund, 1913 S. Qvarnström & Th. Saelan (H). — *K:* *Kyrkslätt st, 1956 Carl Cedercreutz (H) (ÅN); *Masaby st; *Jorvas st; Sperrings f, yard; *S:* *Käla st, 1956 Carl Cedercreutz (H) (ÅN); *Sjundeå st; *D:* *Solberg st. — The species is part of the polemochorous element in the area. The Sperrings occurrence may be of older origin.

Anthyllis vulneraria. — *K:* Makilo, in rock meadow close to a habitation; *S:* *Sjundeå st, Soviet loading platform. — The occurrences represent ssp. *vulgaris* (Koch) Corb. ⇄ *vulneraria* (Prof. Jaakko Jalas, personal comm.).

Lotus corniculatus. Records of indigenous occurrences from the archipelago are found in H. — *K:* *Obbnäs Soviet stable; *Soviet bakery S of Ängvikträsk; *Kyrkslätt st; cart track between Långträsk and Meikoträsk (the last-mentioned represents the spontaneous race v. *maritimus*, determined by Prof. Jaakko Jalas); *D:* Kopparnäs, roadside.

Astragalus sp. — *K:* Kyrkslätt st, Soviet habitations 300 m SE of station, 1958 M. Jahkola & U. Kiistala (H).

Vicia villosa. K: Munkkulla, wheat field, 1913 Anna Waenerberg & M. E. Huumonen (H). — *S:* Broända, site of an old house in the vicinity of Råbacka, 1960 Harri T. Toppari (H).

V. angustifolia. K: Thorsvik, Klobbsund, oat field, 1914 Th. Saelan (H). — *K:* *Jorvas st; Kyrkslätt st, Soviet siding, 1956 Carl Cedercreutz (H) (ÅN); Kyrkslätt centre; Getberg h; Näse h; Friggesby, Soviet airfield; Soviet habitations N of Lillträsk; Strömsby, in rock meadow; Makilo; *S:* Käla st; Broända, site of an old house in the vicinity of Råbacka, 1960 Harri T. Toppari (H); Pickala by a Soviet factory; Pickala f; Billskog f; *D:* Solberg st; Kämpbacka, Nygård f. — The species grows chiefly in rock meadows and places influenced by human activity; it may be part of the polemochorous eastern element.

Lathyrus tuberosus. — *K:* meadow 200 m SW of Bastvik bridge in Sarfvik; Abramsby, in the vicinity of the abandoned garden, 1965 Eero-Pekka Paavolainen (comm. Liisa Kivekäs) (H). — In Sarfvik (in 1957 and 1958) I could not find any traces of Soviet activity around the locality. This is a rare adventive plant in Finland (H). It is also mentioned as a ballast plant from Oulu/Uleåborg (METSÄVAINIO 1926:84).

Geranium pratense. K: Strömsby, meadow, 1904 Asta Forsström (H); *S:* Pickala, garden escape (HJELT 1911:111) (ÅN). — *K:* Danibacka f; Danskarby f; Hindersby—Åminne f; Strömsby f; *S:* Sjundby estate; *D:* *Solberg st, Soviet loading platform; Skräddars-Smeds f. — Apart from one polemochorous occurrence, the species is a garden escape which has spread from the larger farms.

G. palustre. — *K:* *Gunnarsby, Ängsdal-Finnäs f, in garden, introduced during the tenancy, according to the inhabitants.

Erodium cicutarium. — *K:* *Jorvas st, 1956 Carl Cedercreutz (H) (ÅN); Getberg f; *D:* Kårs f, in garden. — The species is a plant of old-fashioned habitations in southern Finland but has also been introduced during the tenancy. *E. cicutarium* is often recorded in polemochorous Soviet vegetation in eastern Fennoscandia (table 1).

Linum catharticum. *K:* Smeds (ROSBERG 1900:109); Edis (HJELT 1911:106); Porkala Stora Träskön, 1932 K. Linkola (H); *S:* Pikkala (HJELT 1911); *D:* Svenvik (HJELT 1911); Kopparnäs; Torbacka; Degerö Knapsund; (3 last-mentioned found by Gunnar Marklund, cf. CEDERCREUTZ 1945). — *K:* Porkala SW-Segelkubb; Makilo in rock meadow; Kyrkslätt st (found in 1966, cf. p. 27).

Euphorbia esula (incl. *virgata* Waldst. et Kit.). — *K:* *Masaby st; Getberg h; railway between Masaby and Bobäck; *Obbnäs harbour; *Pippurn bungalow; Getberg f; Nägels f; Ytterkurk f; level-crossing E of Getberg; *S:* *Käla st; *Sjundeå st; *Pickala, by a Soviet factory; *D:* *Solberg st; Kopparnäs f. — The species is part of the polemochorous Soviet element, but the occurrences on railways and at farms apparently originate from a period prior to the tenancy. At least one occurrence of the eastern *E. virgata* (cf. e.g. ERKAMO 1967) was observed in *K:* Masaby st.

Impatiens glandulifera. — *K:* *Rönnskär (Porkala lighthouse) in the creek on rock ledges. — The species appears to have been introduced into Rönnskär as an ornamental plant. Here it apparently thrives. ERKAMO (1949:146) found that the species set large quantities of seed in Vasa. He (1956:147) attributes its success in Finland to the improvement in the climate. This tall annual, originating from SE Asia, is found in central and western Europe as a garden escape. It now grows along the edge of watercourses in Poland (JASNOWSKI 1961) and in Sweden (WITTE 1941, WESTFELDT 1960).

Althaea rosea. — *K:* Soviet barracks N of Hila f.

Malva moschata. — *K:* *Båtvik, by harbour storehouses (only in 1957). (The species is also found in gardens where it was originally cultivated, 15 occurrences.)

M. pusilla. — *K:* *Kyrkslätt st (found in 1958).

Epilobium hirsutum. — *K:* *Kyrkslätt st; *Munkkulla, by Soviet habitations; *Soviet schools in Kantvik; *Soviet barracks S of Smedsede; *Soviet storehouse SW of Stor-Hila; Finnsbacka f, in garden; Tallbacka f, in garden; *S:* Grefvas-Heicka f; *D:* Halfdels f. — Besides polemochorous occurrences from the tenancy, there are occurrences in gardens which may be of older origin. In 1962—1963 none of the occurrences in Porkala had declined. The species was found on Russarö outside Hangö, where it was introduced during the tenancy (Prof. Hans Luther, personal comm.). On the whole, there are few records from Finland. HIDÉN (1921:155) considered it a »Russian plant» on Sveaborg in Helsingfors. The indigenous range of the species extends in the north-west to the Karelian Isthmus (cf. HIITONEN 1946:111—112, ERKAMO 1967). There are some occurrences S of the Gulf of Finland (VAREP 1959:399).

E. adenocaulum. *K:* Some records in H from fortified islands in the archipelago (cf. FAGERSTRÖM 1944a, 1945a). — More than 100 records from moist habitats, ditches, waste places, railway stations etc. Also common in places influenced by Soviet military activity during the tenancy. (In the archipelago rather common on gull skerries.) More details on p. 24.

E. rubescens. *K:* In H some records from fortified islands in the archipelago (cf. FAGERSTRÖM 1944a). — 55 records. Occurs in similar localities to those of the former species but less frequently. More details on p. 24.

Oenothera biennis. *S:* Sjundby (HJELT 1911:325). — *K:* Båtvik harbour, 1962 Pekka Isoviita (H); Kyrkslätt st, 1965 Guy Hällfors (ÅN 1966); *S:* Sjundby estate (introduced during the tenancy according to the inhabitants).

Chaerophyllum aureum. — *K:* *Kyrkslätt st, close to Soviet storehouse. — In 1963 the species had increased in abundance. In H there is an undetermined specimen from Kyrkslätt st, leg. Reino Repo 3. 7. 1956. *C. aureum* has not earlier been found as an eastern polemochore in eastern Fennoscandia. On the other hand, the species has been introduced with the German military into Kristinestad and Vasa (VALOVIRTA 1949, MALMBERG & BÄCK 1952).

Conium maculatum. K: Parsonage (ROSBERG 1900:109). — *K:* *Jorvas st; Getberg f; Skrobbs f; Sundsberg f; Porkala hamlet; *S:* Billskog f; *D:* Kopparnäs f. — Apart from one adventive occurrence, the species was found around old-fashioned habitations in Porkala.

Levisticum officinale. K: Sigurds, 1920 T. Brander (H). — *K:* Junkars, by Soviet barracks. — This, nowadays rather rare, cultivated plant (HINTIKKA 1933:12) is not known as an adventive plant (cf. HJELT 1911:186). Perhaps it was cultivated in Porkala during the tenancy. According to ŠIŠKIN (1951:41), *L. officinale* often grows in gardens and parks in the Soviet.

Pastinaca sativa. — *K:* *Masaby st; *Jorvas st; *Kyrkslätt st; Båtvik harbour; *Soviet barracks close to Strömsby fork; *Soviet barracks S of Smedsede; Finnsbacka f; Gunnarskulla f; Karlsberg f; Sundsberg f; *S:* *Käla st; *Sjundeå st; Sjundby estate; *D:* Skytts f. — Some occurrences in Porkala originate from the tenancy, but *Pastinaca* also grows by old farms where it may be of medieval origin (cf. PETTERSSON 1943:77, JALAS 1958a:47, SAARISALO-TAUBERT 1963a:114). Nowadays it is spread by traffic and industry (LUTHER 1959:73). ULVINEN (1921) mentioned it among the species often found in Finland as »Russian plants». Thus it has several times been recorded in polemochorous eastern vegetation in eastern Fennoscandia.

Heracleum sphondylium ssp. *sibiricum.* — *K:* Kyrkslätt st; railway between Masaby and Jorvas; Getberg h, near buildings; Gunnarskulla f; Karlsberg f; Nägels f; *S:* Sjundeå st; *D:* Solberg st; Kockby f.

Primula farinosa. — *K:* *Masaby st; *S:* *Sjundeå st. Not found after 1958 in spite of intensive search. — The species grows spontaneously on Åland and in the archipelago of Åboland (e.g. EKLUND 1958:268) and S of the Gulf of Finland (VAREP 1966:840). It is found as a ballast plant in Gamlakarleby, Brahestad and Uleåborg (HJELT 1919:388—389), it was also found in Helsingfors at Åggelby in 1921 (H).

Convolvulus arvensis. K: Hirfsala, (HJELT 1919:400). — *K:* *Kyrkslätt st; *Obbnäs harbour; *Soviet habitations N of Lillträsk; Medvastö, Trädgårdsvilla, in old garden, raspberry patch, 1 individual, 1963 A. Saura (H); *S:* *Käla st; *D:* Solberg st. — The species is one of the most constant plants in the polemochorous eastern vegetation in eastern Fennoscandia (table 1).

Lithospermum arvense. K: Kyrkslätt, 1881 H. Bergroth (H). — *K:* Obbnäs, 1956 Carl Cedercreutz (H); *S:* Sjundby, Nedergård, rock meadow close to the railway. The occurrence found by Cedercreutz is probably of polemochorous origin (not found by me in 1958).

Echium vulgare. — *K:* *Obbnäs harbour; *Obbnäs f; *Abramsby f; *Hirfsala f; *Oppibacka f; *Rilaksholm f; *roadside between Biskopsböle and Kärras; *Lill-Pippurviken (Mr Sigvald Rosberg, personal comm.); *S:* *Käla st; *D:* *Solberg st; Johannesberg f, refuse heap, 1960 Harri T. Toppari (H). — The new inventory made in 1962—1963 showed that the species was still persisting. At Solberg st the species had spread. On Rilaksholm in summer 1963 I noted 20 flowering individuals in a much grazed *Alopecurus — Agrostis* meadow, where the cattle had left the patches of *E. vulgare*. The species is considered somewhat nitrophilous (cf. TÜXEN 1950:158).

Anchusa officinalis. — *K:* *Masaby st, cleaning place for railway carriages during the tenancy; *Obbnäs f, loading place.

Lappula myosotis. — *K:* *Jorvas st; *Obbnäs harbour; Makilo; *S:* *Pickala, in a refuse pit. — The species has been a constituent of the adventive eastern element in eastern Fennoscandia (table 1).

Glechoma hederacea. — *K:* *Kyrkslätt st; Munkkulla f; Hindersby-Åminne f; *S:* Vikars, roadside, 1959 Lars Fagerström (H).

Dracocephalum thymiflorum. — *S:* *Sjundeå st (1958).

Galeopsis ladanum. — *K:* *Jorvas st; Bondarby f on ruined house, *Obbnäs f; *Obbnäs harbour.

Stachys annua. — *K:* *Jorvas st (1958). — This adventive eastern plant is rare in Finland being chiefly found on ballast by harbours and at railway stations. Several records in H show that the species has been introduced from the east with seeds; it has several times been noted in polemochorous eastern vegetation in eastern Fennoscandia.

Salvia verticillata. — *K:* *Obbnäs f, loading place (not found in 1962—1963).

Thymus pulegioides. *K:* Masaby, ditch-bank, 1919 Aarne Rainio (H). — *S:* Käla st station yard.

Hyoscyamus niger. *K:* Getberg, 1910 P. H. Lindberg, 1912 Edit Lindström (H); *S:* Sjundby estate (CEDERCREUTZ 1945:179) (ÅN). — *K:* Kyrkslätt centre near Jolkby; Kolsarby f; Måsabacka f; Obbnäs f; Sundsberg f; *D:* Skadtbondas f.

Solanum dulcamara. *K:* Masaby, »stengård», 1907 Helge Roos; Sarvvik, seashore, 1908 Einar Brander; Thorsvik, 1909 Harald Lindberg; do., Edit Lindström; Sigurds, 1920 Torild Brander (all 5 in H). — 22 occurrences, at loading places, on the ruins of Soviet barracks, in habitats rich in nitrogen such as the vicinity of open drains and latrines.

Verbascum nigrum. *K:* Sigurds, arable land, 1909 Einar Brander (H). — *K:* Kyrkslätt st; Munkkulla f; *S:* Pickala f.

Linaria sp. — *K:* *Kyrkslätt st, in station yard in front of Soviet storehouses ca 15 individuals (in 1958). These had not yet flowered and were reminiscent of *L. genistifolia.* They were about 50 cm high, the leaves being about 3 cm long and 5 mm broad and rather acuminate. Branching occurred only at the base of the stem, the several branches all being erect. The whole plant was grayish green. (Not found in 1962—1963).

Plantago media. — *K:* *Kyrkslätt st; Makilo; *Järvö; *S:* *Sjundeå st; *Käla st; *D:* *Solberg st.

Plantago lanceolata. *K:* Vårnäs, 1860 M. Brenner; Edös, 1885 A. O. Kihlman; Bobäck, meadow, 1927 B. Färdig; Strömsby, wayside, 1904 Asta Forsström; (all 4 in H). — *K:* *Masaby st; *Soviet stable at Edis; Böle Kvarnbacka f; Getberg f; Kolsarby f; Oppibacka f; parsonage; Smedsede f; Sperrings f; Ytterkurk f; rock meadow S of Ytterkurk; Porkala road close to Lill-Kanskog, rock meadow; Porkala road S of Böle fork, rock meadow; Stora Träskön; *S:* *Sjundeå st; Göks h; railway ditch N of Vikträsk; *D:* school N of Strand f. — The species grows on dry hills in rock meadows which are often influenced by human activity, but is also an important constituent of the polemochorous Soviet element. Like the previous species, it is common in the adventive eastern vegetation of eastern Fennoscandia.

Galium mollugo. *K:* Cemetery (HJELT 1923:330); Sundsberg, 1890 Alvar Palmgren; Strömsby, meadow, 1895 M. Brenner; Smeds, timothy field, 1895 M. Brenner; Sigurds, 1918 Torild Brander (all 4 in H). — Common in the whole area (more than 100 records) in meadows, along roadsides and railways, at railway stations and in other waste places. The species occurs rather constantly in polemochorous Soviet vegetation in Porkala.

Galium sp. — *K:* *Kyrkslätt st, close to the Soviet storehouses to the W; *Masaby st, at the loading place. — The plant is about 40 cm high, much branched, the »leaves» short,

5—6/node, the nodes swollen, the »leaves» with apex, flowers small, withered. The plants were similar to a miniature version of *G. mollugo*. At both the stations some specimens were found in 1958—1959.

Erigeron canadense. — *K:* Masaby st; Jorvas st; Kyrkslätt st; the level crossing on Båtvik road in Överby; *Obbnäs harbour; Makilo; *S:* Sjundeå st; Käla st, railway 1956 Carl Cedercreutz (H) (ÅN); loading place E of Käla st; *D:* Solberg st.

Inula britannica. — *K:* *Kyrkslätt st (found again in 1966); *Sundsberg f, yard. — It is indigenous E of Ladoga (cf. HUSTICH 1943:51, PALMÉN 1943:84), where it also grows in hemerobic habitats (cf. e.g. REPO 1949:67, 75). The occurrence on Seiskari is also apparently indigenous (JALAS 1948b). It has sometimes been recorded earlier as an eastern polemochore (cf. also KUPFFER 1922).

Helianthus annuus. — *S:* Käla st, 1956 Carl Cedercreutz (H); *D:* Kockby f, common in yard the first summer after the tenancy according to owner of the farm, (personal comm.). I have noted the species growing in gardens, *K:* Smedede f and *D:* Bergkulla f.

Helianthus sp. — *K:* Masaby embankment E of st; Kyrkslätt st, station yard, 1956 Reino Repo, *S:* Sjundeå st, station yard, 1956 Reino Repo (both in H). In all 3 cases the specimens were very young.

Anthemis tinctoria. — *K:* *Masaby st; *Jorvas st; roadside between Säfvalls and Kärras; *S:* *Sjundeå st; *D:* *Solberg st.

A. arvensis. *K:* Kyrkslätt, 1881 H. Bergroth; Sigurds, 1909 Einar Brander; Sigurds, 1919 Torild Brander; Getberg, arable land, 1910 Edit Lindström; Jorvas, arable land, 1928 Gunhild Fagerström (all 5 in H). — *K:* *Jorvas st; Nägels f, in garden; Näse f, rock meadow; Ytterkurk fallow; *D:* Klevbacka f yard.

Achillea cartilaginea Led. — *K:* *Biskopsböle f, in garden; *Soviet habitations N of Lillträsk; *Obbnäs, shore meadow S of the harbour; *Soviet bakery S of Ängvikträsk; *Makilo, in a yard. — All these occurrences were found again in summer 1963 except the one at Makilo (here the ground had been levelled for building). In Porkala the species seems to be well established in the flora. The occurrences on the shore meadow in Obbnäs are particularly interesting because the locality resembles the indigenous habitats of the species in Soviet Karelia, where *A. cartilaginea* grows spontaneously on the edge of watercourses, in meadow associations together with *A. ptarmica* (cf. HUSTICH 1943:26, 1945:76, FAGERSTRÖM 1945b:140). Before 1918 *A. cartilaginea* was found in Finland around Russian garrisons; in the surroundings of Hämeenlinna/Tavastehus the species has spread and now also grows along the shores of Vanajavesi (H). During World War I it was introduced into Riga with the Soviet troops (KUPFFER 1922:16). This typical representative of the eastern element (e.g. JALAS 1958a:48) has several times been noted in polemochorous Soviet vegetation (see also FAGERSTRÖM 1939—1940:136).

A. nobilis. — *K:* *Kyrkslätt st (noted only in 1957). — Apart from occurring in polemochorous eastern vegetation in eastern Fennoscandia (see also ERKAMO 1967), this rare immigrant has been recorded by harbours and mills (H, cf. MÄKINEN & LAINE 1961:253).

Artemisia campestris. *K:* Kyrkslätt, by the Church; Tolls (HJELT 1926:72—73) (ÅN); parsonage in Gästerby f (CEDERCREUTZ 1927:136) (ÅN); Tolls h, 1937 Ernst Häyrén (H) (ÅN). — K: Masaby st; Jorvas st; Kyrkslätt st; Soviet st S of Gillobacka; railway between Masaby and Jorvas; do. between Jorvas and Tolls; do. between Tolls and Kyrkslätt; *Båtvik harbour storehouses; *Soviet habitations N of Lillträsk; *Edis, Soviet stable; *Soviet barracks at S Obbnäs; *Soviet stable at Obbnäs; *Soviet stable at Strömsby fork; *Kantvik, Soviet schools; Brinkeberg f; Johannesberg f; Munkkulla f; *S:* Käla st; *Sjundeå st; Göks h; Jeppas h; old h E of Käla st; railway E of Sjundeå st; *Soviet barracks between Båtvik

and Pickala. — The species occurs chiefly along roads and railways in the area, but is also found at Soviet loading places and stables. It clearly seems to have been introduced during the tenancy (cf. also table 1 and, for instance, KUPFFER 1922:17). Some occurrences of older origin point to spontaneous establishment or ancient introduction. The occurrences in Kyrkslätt at the parsonage and Tolls are situated close to »Draget», which was once a sea route, an interesting fact because PETTERSSON (1942) considers *A. campestris* one of the species whose occurrences along the coast of Nyland can be connected with old seafaring (cf. however, PALMGREN 1927:28, 122, EKLUND 1943, SKULT 1960:27).

A. austriaca. — *K:* *Kyrkslätt st. In 1957 and 1958 this rare eastern immigrant was rather common around the station, but since 1959 I have been unable to find it.

A. absinthium. K: Vårnäs, 1860 M. Brenner (H). — Rather common in the area (49 records, of which 15 are considered to be polemochorous and date from the tenancy). It grows in gardens, at railway stations, and in waste places and is often found by Soviet habitations. In Porkala it is probably a plant of old-fashioned habitations, being an old cultivated herb (cf. HINTIKKA 1933:15 and ERKAMO 1950), but is also a characteristic constituent of the polemochorous eastern element.

A. siversiana. — *K:* *Kyrkslätt st (in 1957). (In H there is a young specimen from the same place, taken by Reino Repo 3. 7. 1956, which probably belongs to this species). — REPO (1949) mentions it from railways in Petroskoi (specimens in H) and Erkamo collected it in Viborg in several places before the last Finnish wars (H). The species was found at railway stations (Sa, Lappee, Vainikkala st, 1965; Tb, Laukaa, Lievestuore st, 1966; Ok, Suomussalmi, Ämmänsaari st, 1963) by Juha Suominen (H), and was noted close to mills in Turku/Åbo Kuppis (H, cf, MÄKINEN & LAINE 1961:254) and in Jyväskylä. It is a plant of the steppes and forest steppes in southern Russia and Siberia, but has recently spread westwards, reaching central Europe (cf. HEJNÝ 1964 and LEKAVÍČIUS 1965).

Senecio silvaticus. Several records in H. — Ca. 25 new records from hemerobic habitats in the south of Porkala. Apart from occurring on rocks and rock meadows (especially on gull skerries), it has been found along roadsides, on barrack ruins and in other places where the vegetation has been worn away (pp. 23—24).

S. viscosus. — Common throughout the area at railway stations, halts and along the railway. The following occurrences may also be mentioned: *K:* Barracks S of Masaby st; do. NW of Masaby st; parsonage, in garden; storehouse N of parsonage; gravel pit between Masaby and Smedsby; Obbnäs harbour; Soviet barracks above Obbnäs harbour; do. in the north of Obbnäs; do. in the south of Obbnäs; Soviet stable at Obbnäs; Obbnäs along newly constructed roads; Soviet barracks SE of Gillobacka träsk; Soviet hospital in Getberg; Båtvik harbour; Käla-Båtvik, railway, 1956 Carl Cedercreutz (H)(ÅN); Kyrkslätt centre; Finnsbacka f; Hindersby—Åminne f; Kolsarby f, garden; Smedsby f; Överby f; sandpit S of Edö; Edö along Edö road; *S:* Soviet barracks between Båtvik and Pickala; Soviet railway storehouses W of Båtvik; Sjundby estate; *D:* Degerby centre. — The wide distribution in the area can at least partly be ascribed to Soviet activity during the tenancy.

Cichorium intybus. K: Kyrkslätt, earlier cultivated (cf. ROSBERG 1900:114). — *K:* *Jorvas st; *Kyrkslätt st; Makilo; *gravel pit between Masaby and Smedsby; *tank shelter SW of Böle fork; *Soviet habitations N of Lillträsk; *Obbis store S of Smedsede; *Edis Soviet stable; *Biskopsböle f, in garden; Edö f, in garden; Gillobacka f; *Obbnäs f; Porkala Mellangård f; Smedsede f; Sperrings f; Strömsby f; Sundsberg f; Tallbacka f; *S:* *Käla st; *Sjundeå st; Sjundby estate; *D:* *Solberg st; *Soviet tank shelter N of Skytts; *Soviet laundry in Kockby; Kockby f. — The species is one of the most frequent eastern polemochores (table 1), in Porkala it is also very characteristic of Soviet loading places.

Crepis biennis. — *K:* *Kyrkslätt, N of the church on the hillside and below the parsonage garden. — It has probably been introduced into Porkala during the tenancy, otherwise this conspicuous species would surely have been found earlier in such centrally situated localities in Kyrkslätt. Since the achenes of the species are rather big, human agency seems necessary for dispersal over large distances (cf. ERKAMO 1953:128—129). In the SE part of eastern Fennoscandia the species is considered spontaneous (cf. HIITONEN 1946:111—112 but also ERKAMO 1953:123—124) but further west its occurrences are of hemerochorous origin. For instance *C. biennis* is well established in Helsingfors, Åggelby (ERKAMO 1953).

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TABLE 1. *Eastern polemochores in Porkala*

I: number of polemochorus occurrences in Porkala (the parenthesis indicates that the species was not found when the new inventory was made in 1962—63) (Owing to newly received material in H, these records differ a little from the ones published in an earlier paper (NIEMI 1966).

II: Non-polemochorous occurrences in the area (this group includes occurrences recorded before the tenancy, or records which cannot be connected with Soviet activity).

III: Records of occurrences in eastern polemochorous vegetation in other parts of eastern Fennoscandia, made during investigations in the following 17 areas: Sveaborg (HIDÉN 1921), Sandhamn (ULVINEN 1921), Hangö harbour (KARLING 1944), Hangö surroundings (FAGERSTRÖM 1944b), Tvärminne-Lappvik (LUTHER 1948a), Jakobstad (PETTERSSON 1944), Viborg during World War I (PORKKA 1921), Viborg during World War II (ERKAMO 1943a), Kollaa (SAARNIJOKI 1942), Kuhmo (HUUSKONEN 1944, FAGERSTRÖM 1957), Salla (HERLIN 1944), Repola (JALAS 1948a), UHTUA (MANNERKORPI 1943 and 1944), Kiestinki (SÖYRINKI 1941 and 1942, Karhumäki (KYTÖNIEMI 1944, JALAS 1945), Tokari (PERTTULA 1943, REPO 1949) and Petroskoi (PERTTULA 1944, FAGERSTRÖM 1945b, FAGERSTRÖM & LUTHER 1945, REPO 1949).

	I	II	III
Juncus compressus[1]	5	15	—
Lolium perenne	1	>11	3
Poa compressa	16	24	6
Puccinellia distans	1	2	2
Briza media[1]	2	6	3
Avena fatua	6	1	5
Apera spica-venti	2	3	6
Carex vulpina	1	—	2
C. hirta	1	—	—
Cannabis sativa	(1)	—	7
Rumex confertus	3	—	9
R. pseudonatronatus	(1)	—	3
R. obtusifolius	(1)	7	5
R. thyrsiflorus	8	5	3
Chenopodium polyspermum	1	10	3
C. glaucum	3	2	1
C. rubrum	3	—	2
Atriplex tatarica	(1)	—	4
Salsola ruthenica	1	—	3
Cerastium arvense	7	8	3
Herniaria glabra	3	—	3
Silene cucubalus[1]	4	36	5
S. tatarica	(1)	—	2
Melandrium viscosum[1]	(1)	—	—
M. album	12	36	12
Saponaria officinalis	4	36	—
Gypsophila muralis	(3)	4	3
Papaver rhoeas	5	2	—
P. somniferum	5	1	2
Brassica juncea	(2)	—	3
B. ?nigra	(1)	—	—
Sinapis arvensis	7	8	9
S. arvensis v. orientalis	(1)	—	—
S. alba	(1)	—	1
Lepidium ruderale	(2)	3	7
Neslia paniculata	1	2	11
Bunias orientalis	4	32	10
Berteroa incana	7	7	10
Sisymbrium Loeselii	2	—	11
S. altissimum	3	—	8
S. officinale	5	7	3
Camelina microcarpa	2	—	6
Descurainia sophia	8	10	10
Potentilla intermedia	11	5	10
P. thuringiaca ssp. Goldbachii	2	4	2
Alchemilla sarmatica	(1)	—	1
A. propinqua	(1)	—	—
Medicago lupulina	13	4	9
M. falcata	1	—	4
Melilotus albus	6	2	11
M. officinalis	8	6	10
Trifolium campestre	5	2	2
T. aureum	3	11	2
T. arvense	6	2	5
Anthyllis vulneraria	(1)	1	3
Astragalus sp.	(1)	—	—
Geranium pratense	(1)	8	5
G. palustre	(1)	—	1
Erodium cicutarium	1	2	9
Euphorbia esula	7	7	6
Impatiens glandulifera	1	—	—
Malva moschata	(1)	15	—
M. pusilla	(1)	—	11
Epilobium hirsutum	5	4	1
Chaerophyllum aureum	1	—	—
Conium maculatum	1	7	3
Pastinaca sativa	7	7	5
Primula farinosa	(2)	—	—
Convolvulus arvensis	4	3	12
Lithospermum arvense	(1)	2	7
Echium vulgare	10	1	5
Anchusa officinalis	2	—	—
Lappula myosotis	3	1	11
Glechoma hederacea	1	3	3
Dracocephalum thymiflorum	(1)	—	8
Galeopsis ladanum	3	1	6
Stachys annua	(1)	—	4
Salvia verticillata	1	—	1
Linaria (? genistifolia)	(1)	—	—
Plantago media	5	1	10
P. lanceolata	3	19	11
Galium sp.	(2)	—	—
Inula britannica	2	—	3
Helianthus annuus	(2)	2	5
Anthemis tinctoria	4	1	9
A. arvensis	1	8	5
Achillea cartilaginea	5	—	5
A. nobilis	(1)	—	5
Artemisia campestris	9	>18	6
A. austriaca	(1)	—	1
A. absinthium	15	35	8
A. siversiana	(1)	—	1
Cichorium intybus	14	12	8
Crepis biennis	1	—	—

[1]) Spontaneous occurrences in the archipelago have not been included.

Literature

AARIO, L. 1942: Pisin Pogosta. — Terra 53:218—230.

AHTI, T. 1962: On the taxonomy of Erysimum cheiranthoides L. (Cruciferae). — Arch. Soc. »Vanamo» 16(1):22—35.

ALMQUIST, E. 1957: Järnvägsfloristiska notiser. — Svensk Bot. Tidskr. 51:223—263.

BERGMAN, G. 1939: Untersuchungen über die Nistvogelfauna in einem Schärengebiet westlich von Helsingfors. — Acta Zool. Fennica 23:1—134 (about the flora pp. 6—11).

—»— 1945: Porkalanejdens biologiska särdrag. — In: PONTÁN, E. & BRENNER, A. (ed.), Porkalabygden och dess minnen: 57—66. Helsingfors.

—»— 1948: Förändringar i vegetation och fågelfauna i Esbo skärgård under senare år. — Finlands Natur 7:16—23.

—»— 1957: Das Porkalagebiet als biologisches Experimentalfeld. — Acta Soc. Fauna Flora Fennica 74(3):1—52.

BORG, P. 1967: Ecological notes on Fucus wracks near Helsinki. — Memoranda Soc. Fauna Flora Fennica 43:20—36.

BRENNER, A. 1936a: Geografisk översikt och befolkningsstatistik. — In: BRENNER, A. (ed.), Ingå, Fagervik, Degerby. En västnyländsk bygdekrönika I: 9—14. Ekenäs.

—»— 1936b: Byar, gårdar och släkter i Degerby socken. — In: BRENNER, A. (ed.), Ingå, Fagervik, Degerby. En västnyländsk bygdekrönika II: 144—232. Ekenäs.

—»— 1953: Sjundeå sockens historia I. — 508 pp. Hangö.

BRENNER, M. 1898: »Notiser om vegetationen i Kyrkslätt». — Meddel. Soc. Fauna Flora Fennica 23:5—7.

BRENNER, T. 1945: Skärgård och fastland. — In: PONTÁN, E. & BRENNER, A. (ed.), Porkalabygden och dess minnen: 9—56. Helsingfors.

BRENNER, W. 1921a: Studier över vegetationen i en del av västra Nyland och dess förhållande till markbeskaffenheten. — Fennia 43 (2): 1—105.

—»— 1921b: Växtgeografiska studier i Barösunds skärgård. I. — Acta Soc. Fauna Flora Fennica 49(5):1—151.

—»— 1931: Beiträge zur edaphischen Ökologie der Vegetation Finnlands. II. Wiesen. — Acta Bot. Fennica 9:1—58.

BRUN-HOOL, J. 1962: Pflanzengesellschaften der Wege. — Mitt. Naturf. Ges. Luzern 19:65—151.

BUCH, H. 1940: Några anmärkningsvärda Alchemilla-fynd. — Memoranda Soc. Fauna Flora Fennica 15:234—235.

CEDERCREUTZ, C. 1927: Studien über Laubwiesen in den Kirchspielen Kyrkslätt und Esbo in Südfinnland. — Acta Bot. Fennica 3:1—181.

—»— 1928: Bidrag till västra Nylands flora. — Memoranda Soc. Fauna Flora Fennica 4:172—176.

—»— 1930: Vegetationen och floran. — In: JANSSON, A. (ed.), Kyrkslätt förr och nu: 91—100. Helsingfors.

—»— 1945: Växtgeografiska anteckningar från Porkalaområdet. — Memoranda Soc. Fauna Flora Fennica 21:170—180.

EKLUND, O. 1927: Über Rumex thyrsiflorus Fingerh. im ostfennoscandischen Florengebiet. — Memoranda Soc. Fauna Flora Fennica 1:20—29.

—»— 1943: Några ord om Artemisia campestris. — Nordenskiöld-samf. Tidskr. 3:147—148.

—»— 1946: Über die Kalkabhängigkeit der Kormophyten SW-Finnlands. — Memoranda Soc. Fauna Flora Fennica 22:166—187.

—»— 1958: Die Gefässpflanzenflora beiderseits Skiftet im Schärenarchipel Südwestfinnlands. — Bidrag till Kännedomen om Finlands Natur och Folk, 101:1—321.

ELFVING, F. 1897: Anteckningar om kulturväxterna i Finland. — Acta Soc. Fauna Flora Fennica 14(2):1—116.

ERKAMO, V. 1943a: Bolschevikkiajan merkeistä Viipurin kasvistossa. — Ann. Bot. Soc. »Vanamo» 18(3):1—24.
—»— 1943b: Unkarilaisen pernaruohon, Sisymbrium altissimum L., esiintymisestä ja leviämisestä Helsingissä v. 1939—41. — Ann. Bot. Soc. »Vanamo» 17(4):1—64.
—»— 1944: Kulttuurin seuralaisista ja suosijoista Helsingin Vanhankaupungin kasvistossa. — Luonnon Ystävä 48:153—159.
—»— 1945: Havaintoja pommikuoppien kasvistosta. — Luonnon Ystävä 49:252—253.
—»— 1948: Kasvilöytöjä lentokentältä. — Luonnon Tutkija 52:58.
—»— 1949: Salvinia rotundifolia Willd. ja Impatiens Roylei Walpers löydetty Suomesta vapaasta luonnosta. — Arch. Soc. »Vanamo» 2:142—148.
—»— 1950: Artemisia absinthium L., sen kansanomaiset nimitykset ja levinneisyys Suomessa. — Arch. Soc. »Vanamo» 4:150—158.
—»— 1953: Kaksivuotisesta keltosta, Crepis biennis L., Itä-Fennoskandiassa. — Arch. Soc. »Vanamo» 7(2):121—130.
—»— 1956: Untersuchungen über die pflanzenbiologischen und einige andere Folgeerscheinungen der neuzeitlichen Klimaschwankung in Finnland. — Ann. Bot. Soc. »Vanamo» 28(3):1—290.
—»— 1958: Carex praecox Schreb. — In: JALAS, J. (ed.), Suuri Kasvikirja I: 653—654. Helsinki.
—»— 1965: Rumex confertus Willd. — In: JALAS, J. (ed.), Suuri Kasvikirja II: 131—132. Helsinki.
—»— 1967: Kasviretki Karjalan kannakselle. Muistelma 30 vuoden takaa. — Luonnon Tutkija 71:130—135.
FAGERSTRÖM, L. 1939—1940: Ett bidrag till kännedomen om vegetation och flora i Terijoki socken på Karelska näset. — Memoranda Soc. Fauna Flora Fennica 15:94—140.
—»— 1941: Några nya fynd av Epilobium adenocaulon Hausskn. och ssp. rubescens (Rydb.) Hiit. — Memoranda Soc. Fauna Flora Fennica 17:66—68.
—»— 1944a: Nya fynd av Epilobium adenocaulon Hausskn. och E. rubescens Rydb. vid den sydfinska kusten. — Memoranda Soc. Fauna Flora Fennica 19:28—36.
—»— 1944b: Floristiskt från Hangö-området. — Memoranda Soc. Fauna Flora Fennica 19:36—42.
—»— 1945a: Epilobium adenocaulon Hausskn. och E. rubescens Rydb. funna på nya lokaler vid den sydfinska kusten. — Memoranda Soc. Fauna Flora Fennica 20:145—147.
—»— 1945b: Växtgeografiska anteckningar från en färd i Fjärr-Karelen sensommaren 1942. — Memoranda Soc. Fauna Flora Fennica 20:107—142.
—»— 1946: Några anteckningar om Tragopogon pratensis L., Cerastium arvense L. och Potentilla Goldbachii Rupr. — Memoranda Soc. Fauna Flora Fennica 22:65—68.
—»— 1953: Växtfynd i Aspö (Haapasaari) skärgård i Karelia australis. I. — Memoranda Soc. Fauna Flora Fennica 28:60—66.
—»— 1957: Anteckningar om floran i några vinterkrigstida mottiområden i Ok Kuhmo, sommaren 1954. — Memoranda Soc. Fauna Flora Fennica 32:112—119.
—»— 1958a and b: Juncus compressus Jacq.; Carex hirta L. — In: JALAS, J. (ed.), Suuri Kasvikirja I: 298—299, 754—755. Helsinki.
—»— & JAHKOLA, M. 1960: Lounais-Hämeen ratapihojen ja ratavallien kasvistosta. — Lounais-Hämeen Luonto 8:56—62.
—»— & LUTHER, H. 1945: Ruderatväxter från Petroskoi bangård sommaren 1943. — Memoranda Soc. Fauna Flora Fennica 21:142—150.
FLEEGE, U. A. 1900: Kultur och utveckling. — In: ROSBERG, J. E. & FLEEGE, U. A. (ed.), Kyrkslätt socken, dess natur, utveckling och historia II: 1—196. Helsingfors.
—»— 1901: Historia. — In: ROSBERG, J. E. & FLEEGE, U. A. (ed.), Kyrkslätt socken, dess natur, utveckling och historia III: 1—205. Helsingfors.
—»— 1930: Den historiska utvecklingen. — In: JANSSON, A. (ed.), Kyrkslätt förr och nu: 404—460. Helsingfors.
FRIES, M. 1958: Vegetationsutveckling och odlingshistoria i Varnhemstrakten. En pollenanalytisk undersökning i Västergötland. — Acta Phytogeogr. Suecica 39:1—63.
GRANÖ, O. 1953: Die Flora in ihrer Beziehung zur Kultur im Schärenhof von Porvoo in Südfinnland. — Ann. Bot. Soc. »Vanamo» 25(4):1—47.
HAUSEN, R. 1910: Finlands medeltidsurkunder I. — 594 pp. Helsingfors.

HAVUKAINEN, S.-L. 1963: Onko Helsinki sijainnut kansainvälisen, Länsi-Euroopan ja Venäjän välisen kauppatien varrella? — Har Helsingfors legat vid den internationella handelsvägen mellan Väst-Europa och Ryssland? — Terra 75:269—281.

HÄYRÉN, E. 1900: Längs-zonerna i Ekenäs skärgård. — Geogr. Fören. (i Finland) Tidskr. 12:222—234.

—»— 1931: Aus den Schären Südfinnlands. — Verh. Int. Ver. Theor. Angew. Limnol. 5(2):488—507.

HEIKKINEN, L. 1959: Sota-ajan tulokaskasvistosta Hyrynsalmella. — Memoranda Soc. Fauna Flora Fennica 34:57—71.

HEINTZE, A. 1918: Om endo- och synzoisk fröspridning genom europeiska kråkfåglar. — Bot. Not. 1918: 1—47.

HEJNÝ, S. 1958: Iva xanthifolia Nutt. v ČSR. — Acta Fac. Rer. Natur. Univ. Comen. Bratislava, Bot., 2/VII—IX:323—342.

—»— 1964: Artemisia sieversiana Willd., eine neue eingeschleppte Art in der Tschechoslowakei. — Preslia 36:392—402.

HERLIN, N. 1944: Ruderaten von Ks, Salla im Sommer 1941. — Memoranda Soc. Fauna Flora Fennica 19:90—91.

HIDÉN (= HIITONEN), I. 1921: Suomenlinnan kasvisto. — Luonnon Ystävä 25:153—156.

—»— 1922: Tietoja kasvistosta eräillä rautatieasemilla ja satamaradoilla kesällä v. 1921. — Luonnon Ystävä 26:89—95.

—»— 1927: Lisätietoja Rumex confertus'en esiintymisestä Suomessa. — Memoranda Soc. Fauna Flora Fennica 3:39—40.

HIITONEN, I., 1933: Suomen Kasvio. — 771 pp. Helsinki.

—»— 1938: Horsmalajin Epilobium adenocaulon Hausskn. levinneisyys Suomessa. — Luonnon Ystävä 42:67—77, 105—110.

—»— 1946: Karjalan Kannas kasvien vaellustienä lajien nykylevinneisyyden valossa. — Ann. Bot. Soc. »Vanamo» 22(1):1—206.

HILLI, A. 1963: Valtion Siementarkastuslaitos. Toiminta 1/9 1961—31/8 1962. — Maataloushallituksen tiedonantoja 350:1—54.

HINTIKKA, T. J. 1928: Muutamien vanhojen koriste- ja lääkekasviemme levinneisyydestä ja kulttuurihistoriasta. — Luonnon Ystävä 32:121—132.

—»— 1933: Über die Verbreitung einiger alter perenner Kulturpflanzen in Finnland. — Ann. Bot. Soc. »Vanamo» 4(11):1—24.

HISINGER, E. V. E. 1855: Flora Fagervikiensis. — Not. Sällsk. Fauna Flora Fennica Förhandl. 3:1—60.

HJELT, H. 1888—1926: Conspectus Florae Fennicae I—VII. — Acta Soc. Fauna Flora Fennica 5, 21, 30, 35, 41, 51 and 54.

HOLLER, 1883: Die Eisenbahn als Verbreitungsmittel von Pflanzen. — Flora, N.R. 41:197—204.

HUSTICH, I. 1939: Porkala nationalpark. — Forstliga forskningsanstaltens populärvetenskapliga beskrivningar av naturskyddsområden 3:1—47. Helsingfors.

—»— 1943: Eine pflanzengeographische Übersicht über das Gebiet Kuuttilahti am Sywäri-Swir (Fern-Karelien). — Acta Soc. Fauna Flora Fennica 63(3):1—53.

—»— 1945: Pflanzengeographische Übersicht über das Kuujärvigebiet am mittleren Swir in Fern-Karelien. — Memoranda Soc. Fauna Flora Fennica 20:46—77.

HUUSKONEN, A. J. 1944: Talvisodan sotatoimien vaikutuksesta kasvistoon Kuhmon »mottialueella». — Luonnon Ystävä 48:231—232.

HYLANDER, N. 1955: Förteckning över Nordens växter 1. Kärlväxter. 4. utvidg. uppl. — 175 pp. Lund.

JAAKKOLA, J. 1956: Suomen varhaishistoria. Heimokausi ja »Kalevala-kulttuuri». Suomen historia II. — 462 pp. Porvoo-Helsinki.

JALAS, J. 1945: Muistiinpanoja antropokoreista Karhumäessä (Kon) syksyllä 1942. — Ann. Bot. Soc. »Vanamo» 20:64—67.

—»— 1948a: Kylien kasvistosta Repolan piirikunnassa Länsi-Pomorian (Kpoc) lounaiskolkassa. — Acta Soc. Fauna Flora Fennica 66(3):1—58.

—»— 1948b: Kasvistollisia tietoja Seiskarista (Ka). — Arch. Soc. »Vanamo» 1:110—116.

—»— 1953: Hemerokorit ja hemerobit. Kasvien kulttuurisuhteisiin liittyvän oppisanaston selvitysyritys. — Luonnon Tutkija 57:12—16.

—»— 1955: Hemerobe und hemerochore Pflanzenarten. Ein terminologischer Reformversuch. — Acta Soc. Fauna Flora Fennica 72(11):1—15.

JALAS, J. 1957: Die geobotanische Nordostgrenze der sog. Eichenzone Südwestfinnlands. — Ann. Bot. Soc. »Vanamo» 29(5):1—32.
—»— 1958a: Kulttuurin vaikutuksesta Suomen Kasvistoon. — In: Oma maa I: 41—53. Porvoo.
—»— 1958b: Avena fatua L. — In: JALAS, J. (ed.), Suuri Kasvikirja I: 441—442. Helsinki.
—»— 1960: Distribution and history of different hairiness types of Medicago lupulina L. in eastern Fennoscandia. — Feddes Repert. 63(2):215—218.
—»— 1965a, b, c: Rumex thyrsiflorus Fingerh.; Alchemilla propinqua Lindb.fil.; Alchemilla baltica Sam. — In: JALAS, J. (ed.), Suuri Kasvikirja II: 144—146, 726—727, 744—745. Helsinki.
JASNOWSKI, M. 1961: Impatiens Roylei Walpers — nowy skladnik lašow legowych w Polsce (Ref.: Impatiens Roylei Walpers — eine neue Auenwaldpflanze in Polen). — Fragm. Flor. Geobot. 7(1):77—80.
JOHANSSON, O. V. 1930: Klimatet i Kyrkslätt. — In: JANSSON, A. (ed.), Kyrkslätt förr och nu: 70—90. Helsingfors.
JUTIKKALA, E. 1958: Suomen talonpojan historia. — Suomalaisen Kirjallisuuden Seuran toimituksia 257:1—480. Helsinki.
KALELA, A. 1943a: Eräiden itäisten Rumex-lajien esiintymisestä Itä-Karjalassa. — Luonnon Ystävä 47:113.
—»— 1943b: Die Ostgrenze Fennoskandiens in pflanzengeographischer Beziehung. — Veröff. Geobot. Inst. Rübel Zürich 20:1—68.
—»— 1949: Mistä ja milloin Suomi on saanut kasvistonsa? — Suomen Luonto 8:9—30.
KARLING, T. G. 1944: Några fynd av adventivväxter i Hangö hamn. — Memoranda Soc. Fauna Flora Fennica 19:42—43.
KERKKONEN, G. 1945: Västnyländsk kustbebyggelse under medeltiden. — Svenska Litteratursällsk. i Finland Skrifter 301:1—288. Helsingfors.
—»— 1959: Bondesegel på Finska viken. — Svenska Litteratursällsk. i Finland Skrifter 369:1—218. Borgå.
KORSMO, E. 1926: Ogräs. Svenska jordbrukets bok. — 410 pp. Stockholm.
KREH, W. 1955: Das Ergebnis der Vegetationsentwicklung auf dem Stuttgarter Trümmerschutt. — Mitt. Flor.-Soz. Arbeitsgem., N.F. 5:69—75. Stolzenau/Weser.
—»— 1960: Die Pflanzenwelt des Güterbahnhofs in ihrer Abhängigkeit von Technik und Verkehr. — Mitt. Flor.-Soz. Arbeitsgem., N.F. 8:86—109.
KUPFFER, K. R. 1922: Der Einfluss des Weltkrieges auf die Pflanzenwelt bei Riga. — Arb. Naturf.-Ver. Riga, N.F. 14:1—24.
—»— 1925: Grundzüge der Pflanzengeographie des ostbaltischen Gebietes. — Abh. Herder-Inst. Riga 1(6):1—224.
KYTÖNIEMI, A. 1944: Kasvitietoja Karhumäestä (Äk). — Ann. Bot. Soc. »Vanamo» 20: Not. 35—39.
LEHMANN, E. 1895: Flora von Polnisch — Livland mit besonderer Berücksichtigung der Florengebiete Nordwestrusslands, des Ostbalticums, der Gouvernements Pskow und St. Petersburg sowie der Verbreitung der Pflanzen durch Eisenbahnen. — Arch. für die Naturkunde Liv-, Ehst- und Kurlands. (Zweite Ser., Biol. Naturkunde) 9:1—430. Jurjew (Dorpat).
LINDBERG, H. 1903: Ogräsfrön bland den senaste vinter från Ryssland importerade utsädeshafren. — Meddel. Soc. Fauna Flora Fennica 29:173—180.
LINKOLA, K. 1916: Studien über den Einfluss der Kultur auf die Flora in den Gegenden nördlich vom Ladogasee I. — Acta Soc. Fauna Flora Fennica 45(1):1—429.
—»— 1917: Vanhan kulttuurin seuralaiskasveja maamme ruderati- ja rikkaruohokasvistossa. — Terra 29:125—152.
—»— 1918a: Kasveista, jotka viime vuosikymmeninä ovat maassamme suuresti levinneet. — Luonnon Ystävä 22:1—21.
—»— 1918b: Piirteitä satunnaiskasviston ja varsinkin Cruciferae-heimon satunnaiskasvien levenemissuhteista maassamme. — Luonnon Ystävä 22:29—34.
—»— 1920: Tulokaskasvistosta eräillä rautatieasemillamme kesällä v. 1918. — Meddel. Soc. Fauna Flora Fennica 45:16—22.
—»— 1933: Über Rückgangserscheinungen in der ruderalen Begleitflora der altenKultur in Süd-Häme. — Ann. Bot. Soc. »Vanamo» 4(12):3—7.
—»— 1942: Suomen hierakan (Rumex fennicus) levinneisyydestä ja uudesta leviämisestä maassamme. — Luonnon Ystävä 46:3—13.

LINKOLA, K. 1943: Poa compressa L. leviämässä kulttuurinseuralaisena. — Memoranda Soc. Fauna Flora Fennica 18:45—56.

LITVINOVA, D. I. 1926: O južnyh zanosnyh rastenijah na severnyh stancnjah Murmanskoj žleznoj dorogi. — Bull. Acad. Sci. URSS 1926:59—66.

LEKAVIČIUS, A. 1965: Novye v litve vidy vyssih rastenij, najdennye v. 1963 g. — Lietuvos TSR Mokslu Akademijos Darbai, (Serija C) 2(37):23—28.

LOUSLEY, J. E. 1944: The pioneer flora of bombed sites in central London. — Rep. Bot. Exch. Club 1941—42:528—531.

LUTHER, H. 1940: Anteckningar om adventivfloran i Lappvik åren 1925—1939. — Memoranda Soc. Fauna Flora Fennica 16:9—15.

—»— 1948a: Krigets spår i Finlands flora. — Memoranda Soc. Fauna Flora Fennica 24:138—160.

—»— 1948b: Tyska polemokorer och andra adventivväxter från Uleåborg. — Memoranda Soc. Fauna Flora Fennica 24:80—86.

—»— 1959: Växtvärlden i Pojo. — In: Pojo sockens historia I: 54—82. Borgå.

—»— 1961a: Veränderungen in der Gefässpflanzenflora der Meeresfelsen von Tvärminne. — Acta Bot. Fennica 62:1—100.

—»— 1961b: Die Schärenzonen. — Arch. Soc. »Vanamo» 16 (suppl. XIII. I.P.E.): 23—25.

MÄKINEN, Y. & LAINE, U. 1961: Turun tulokaskasvisto. — Turun Ylioppilas 8:193—259.

MALMBERG, M. & BÄCK, R. 1952: Nya växtfynd i Vasa. — Arkiv Svenska Österbotten 10:237—250.

MANNERKORPI, P. 1943: Muistiinpanoja Uhtuan suunnan kasvillisuudesta. — Ann. Bot. Soc. »Vanamo» 18: Not. 19—32.

—»— 1944: Uhtuan taistelurintamalle saapuneista tulokaskasveista. — Ann. Bot. Soc. »Vanamo»20: Not. 39—51.

MARKLUND, G. 1933: Über Potentilla argentea L. und P. impolita Wahlenb. — Memoranda Soc. Fauna Flora Fennica 9:2—13.

—»— 1964: En för mellersta Norrland och den västnyländska svenskbygden gemensam majranunkel. — Svensk Bot. Tidskr. 58(1):18—26.

MATTHIES, H. 1925: Die Bedeutung der Eisenbahnen und der Schiffahrt für die Pflanzenverbreitung in Mecklenburg. — Arch. Ver. Freunde Naturgesch. Mecklenburg, N.F. 1:27—97.

METSÄVAINIO, K. 1926: Oulun satunnaiskasvisto vuosina 1917—1925. — Luonnon Ystävä 30:80—86.

MEUSEL, H. 1943: Vergleichende Arealkunde I. — 466 pp. Berlin-Zehlendorf.

MIKKOLA, R. 1966: Ratakasvihavaintoja Siitaman ja Lylyn seudulta (Orivesi, Kangasala ja Juupajoki, Ta). — Memoranda Soc. Fauna Flora Fennica 42:14—26.

MÜHLENBACH, V. 1932: Die Adventivflora des Rigaer Eisenbahnknotens. — Acta Horti Bot. Univ. Latviensis 7:87—130.

NIEMI, Å. 1960: Nationalparken Stora Träskön — ett minne. — Finlands Natur 18:7—11.

—»— 1964: Studier över den hemerofila floran i Porkalaområdet. — Ph. lic. thesis (in the library of the Department of Botany, University of Helsinki).

—»— 1966: Vuokra-ajan vaikutuksesta Porkkalan alueen kasvistoon. — Luonnon Tutkija 70:43—58.

—»— 1967: Hemerophilous plants on gull skerries in the archipelago SW of Helsingfors. — Memoranda Soc. Fauna Flora Fennica 43:8—16.

—»— 1968: Lepidium ruderale L. on gull skerries in the archipelago SW of Helsingfors. — Memoranda Soc. Fauna Flora Fennica 44:5—12.

NORDHAGEN, R. 1935: Hvorledes plantenes frö erobrer jorden. — 96 pp. Oslo.

NUMMELIN, A. 1930: Korta hemmanshistoriker. — In: JANSSON, A. (ed.), Kyrkslätt förr och nu: 547—672. Helsingfors.

ÖHMAN, E. 1959: Gamla farleder i västra Nyland. — Nordenskiöld-samf. Tidskr. 19:21—43.

OLSONI, B. 1927: Växtfynd i Ab Kimito-Hitis sommaren 1926. — Memoranda Soc. Fauna Flora Fennica 3:38—39.

—»— 1937: Botaniskt från Lavansaari, Seiskari o. Penisaari. — Memoranda Soc. Fauna Flora Fennica 13:19—21.

—»— 1944: Växterna på de bombade tomterna i Borgå 1942. — Memoranda Soc. Fauna Flora Fennica 19:148—151.

PALMÉN, E. 1943: Zur Kenntnis der Flora und Vegetation eines Uferabschnitts am Laatokkasee nördlich der Syväri-Mündung. — Ann. Bot. Soc. »Vanamo» 19(2):1—93.

PALMGREN, A. 1927: Die Einwanderungswege der Flora nach den Ålandsinseln. I. — Acta Bot. Fennica 2:1—198.

PALMGREN, R. 1930: Djurlivet. — In: JANSSON, A. (ed.), Kyrkslätt förr och nu: 101—106. Helsingfors.

PEDERSEN, A. 1955: Indslæbte planter ved jernbanerne. — Flora og Fauna 61:81—109.

PERTTULA, U. 1943: Rikkaruohoja ja satunnaiskasveja Tokarin asemalla (SK). — Luonnon Ystävä 47:24.

—»— 1944: Tietoja eräiden kasvilajien löytöpaikoista AK- ja ÄK-maakunnissa. — Luonnon Ystävä 48:162—163.

PETTERSSON, B. 1931: Notes on the first stages of flora on burnt ground. — Memoranda Soc. Fauna Flora Fennica 7:119—139.

—»— 1942: Sannolika kulturspår i den nyländska kustfloran. — Nordenskiöld-samf. Tidskr. 2:72—108.

—»— 1943: Av människan införda växter i floran kring våra fornborgar och medeltidsfästen. — Nordenskiöld-samf. Tidskr. 3:33—84.

—»— 1944: Växtvandringar förorsakade av invasioner och krig. — Nordenskiöld-samf. Tidskr. 4:19—80.

PIISPALA, E. 1964: Epilobium adenocaulum Hausskn. und E. rubescens Rydb. in Ostfennoskandien. — Ann. Bot. Fennici 1:36—46.

PORKKA, O. H. 1921: Tietoja satunnaiskasveista Viipurin garnisoonin kasarmialueilla kesällä 1920. — Luonnon Ystävä 25:35—37.

—»— 1926: Satunnaiskasveja Antrean pitäjästä. — Ann. Soc. »Vanamo» 3(6):233—238.

REGELIS, K. 1936: Ueber Rumex confertus Willd. — Mem. Fac. Sci. Univ. Vytautas le Grand (Kaunas) 11:86—98.

REPO, R. 1949: Havaintoja antropokorikasvien esiintymisestä Etelä-Aunuksessa v. 1941—44. — Arch. Soc. »Vanamo» 3:59—77.

RIDLEY, H. N. 1930: The dispersal of plants throughout the world. — 744 pp. Ashford.

ROMELL, L.-G. 1938: Växternas spridningsmöjligheter. — In: SKOTTSBERG, C. (ed.), Växternas liv IV: 279—448. Stockholm.

ROSBERG, J. E. 1900: Naturen. — In: ROSBERG, J. E. & FLEEGE, U.A. (ed.), Kyrkslätt socken, dess natur, utveckling och historia I:1—119. Helsingfors.

—»— 1930: Naturen i Kyrkslätt. — In: JANSSON, A. (ed.), Kyrkslätt förr och nu: 11—69. Helsingfors.

SAARISALO-TAUBERT, A. 1963a: Die Flora in ihrer Beziehung zur Siedlung und Siedlungsgeschichte in den südfinnischen Städten Porvoo, Loviisa und Hamina. — Ann. Bot. Soc. »Vanamo» 35(1):1—190.

—»— 1963b: Suomen rannikon vanhat kauppatiet ja Cardamine parviflora. — Luonnon Tutkija 67:101—104.

SAARNIJOKI, S. 1942: Satunnaiskasveja Kollaan taistelupaikoilta. — Luonnon Ystävä 46:69.

SALISBURY, E. J. 1943: The flora of bombed areas. — Nature 151:462—66.

SAMUELSSON, G. 1943: Die Verbreitung der Alchemilla-Arten aus der Vulgaris-Gruppe in Nordeuropa. — Acta Phytogeogr. Suecica 16:1—159.

SEGERSTRÅLE, C. 1945: Fiskerinäringen. — In: PONTÁN, E. & BRENNER, A. (ed.), Porkalabygden och dess minnen: 163—181. Helsingfors.

SERNANDER, R. 1901: Den Skandinaviska vegetationens spridningsbiologi. — 459 pp. Upsala.

—»— 1906: Entwurf einer Monographie der Europäischen Myrmekochoren. — Kungl. Svenska Vetenskaps Akad. Handl. 41(7):1—410.

SILKKILÄ, O. K. 1943: Carex riparia, Rumex fennicus ym. kasvilöytöjä Kouvolan seuduilta. — Luonnon Ystävä 47:23—24.

—»— 1944: Rumex fennicuksen esiintymisestä Kouvolan seuduilla. — Luonnon Ystävä 48:100.

ŠIŠKIN, B. K. 1951: Levisticum Hill. — In: ŠIŠKIN, B. K. (ed.), Flora SSSR XVII: 40—42. Moskva-Leningrad.

SKULT, H. (1960): Om kärlväxtfloran i Korpo, Brunskär, en utskärsarkipelag. — Acta Soc. Fauna Flora Fennica 76(1):1—101.

—»— 1965: Melandrium viscosum (L.) Čel. — In: JALAS, J. (ed.), Suuri kasvikirja II: 301—302. Helsinki.

SÖYRINKI, N. 1941: Havaintoja kyläkasvistosta Vienan Karjalassa sotakesänä v. 1941. — Luonnon Ystävä 45:150—164.
—»— 1942: Oikaisuja ja lisäyksiä Kiestingin kasviluetteloon. — Luonnon Ystävä 46:70.
STERNER, R. 1922: The continental element in the flora of South Sweden. — Geografiska annaler 1922:221—444.
THELLUNG, A. 1917: Stratiobotanik. — Vierteljahrsschr. Naturf. Ges. Zürich 62:327—335.
TÖRNROTH, H. 1959: »Poa supina inom Porkalaområdet». — Memoranda Soc. Fauna Flora Fennica 34:1.
TRZCIŃSKA-TACIK, H. 1963: Badania nad zasiegami roślin synantropijnych. 2. Rumex confertus Willd. w Polsce. (Ref.: Studies on the distribution of synanthropic plants. 2. Rumex confertus Willd. in Poland.) — Fragm. Flor. Geobot. 9(1):73—84.
TUOMIKOSKI, R. 1942: Kulttuurikasvillisuuden tutkimisesta. — Luonnon Ystävä 46: 173—178.
TÜXEN, R. 1950: Grundriss einer Systematik der nitrophilen Unkrautgesellschaften in der Eurosibirischen Region Europas. — Mitt. Flor.-Soz. Arbeitsgem., N.F. 2:94—175.
ULVINEN, A. 1921: Tietoja Santahaminan tulokaskasvistosta. — Luonnon Ystävä 25: 157—160.
—»— 1949: Kasvit Kouvolan seutua valloittamassa. — Kymenlaakson Osakunnan kotiseutujulkaisu »Ankkapurha» 2:181—211. Kotka.
VALOVIRTA, E. J. 1949: Keskieurooppalaista kasvilajistoa Kristiinankaupungin satamassa. — Arch. Soc. »Vanamo» 4(1):53—60.
VAREP, E. 1959: Eesti NSV Floora III. — 536 pp. Tallinn.
—»— 1966: Primulaceae. — In: KASK, M. & VAGA, A. (ed.), Eesti Taimede Määraja: 839—846. Tallinn.
VASARI, Y. 1965: Silene tatarica (L.) Pers. — In: JALAS, J. (ed.), Suuri kasvikirja II: 296—298. Helsinki.
WESTFELDT, G. A. 1960: Impatiens glandulifera Royle i Marks härad, södra Västergötland. — Svensk Bot. Tidskr. 54:598—600.
VIDLUND, U. 1947: Adventivväxter i Yxpila hamnområde. — Arkiv Svenska Österbotten 6:1—7.
WIINSTEDT, K. 1940: Danske jernbaneplanter. — Bot. Tidsskr. 45:195—199.
WILMANNS, O. & BAMMERT, J. 1965: Zur Besiedlung der Freiburger Trümmerflächen — eine Bilanz nach zwanzig Jahren. — Ber. Naturf. Ges. Freiburg i. Br. 55:399—411.
WITTE, H. 1941: Impatiens glanduligera Lindley såsom adventivväxt i Sverige. — Svensk Bot. Tidskr. 35:211—218.

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